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Australia's Leading Computer Magazine

COVER STORY

- Personal finance software
- Electronic banking
- Online finance sites
- Electronic investment tools
- Business accounting
- Security survival guide

FIRST TAKE

Intel's Celeron
PalmPilot III
PhotoShop 5
BeOS for PC
Microsoft Visual J++
Canon's \$200 scanner
Epson Stylus Photo EX

WORKSHOP

- Inside the hard disk
- How to set up multiple operating systems
- Tips for installing Windows
- Windows programming 101
- Plus: Mac, Linux, OS/2, JavaScript, Hypertext and Shareware

On this month's CD

YOUR MONEY & YOUR LIFE

- Personal finance software
- Personal information managers
- Investment and stock market tools
- Taxation
- Business accounting
- Stock and inventory tools
- Ecommerce

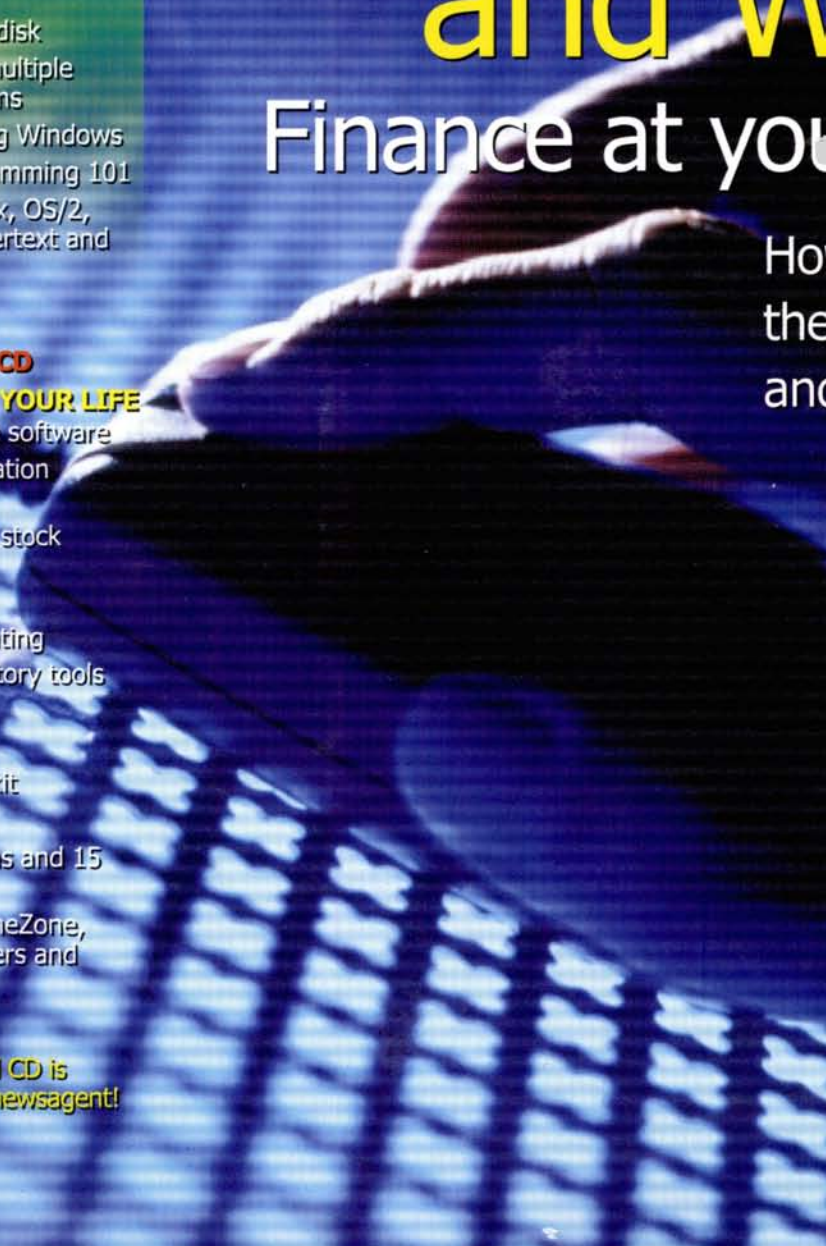
- Mobile survival kit

- 82 new programs and 15 updates
- New & Hot, GameZone, Bandwidth Busters and much more

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Control your bank accounts, mortgage, credit cards, loans and financial future with these 12 tools. Plus seven investment and stock tracking tools and six programs to ease tax time.

BUSINESS FINANCE:

11 business accounting and finance programs, 10 inventory and stock control tools, and an ecommerce server.

PERSONAL ORGANISERS:

Once your money's sorted out, get your life in order and manage your calendar, contacts and to-do lists with one of 14 top personal information managers.

As usual, our crack **apcmag.cd** team has trawled the Net for the latest and greatest software for you to test. Linux users: check out the infamous Gimp! Also this month we have Netscape Navigator 4.05, Paint Shop Pro 5 and QuickTime 3.

NEW & HOT

Arachne 1.2 (final beta) ■ AutoZip 98 2.2 ■ CopyPaste 1.5 ■ Launch Board 2.0 ■ NetSonic 1.0 ■ PowerBar 1.6 ■ RZSplit 2.1a ■ Safety Net Pro 6.4 ■ SciTech Display Doctor 6.51 ■ Task Menu 2.0 ■ interMute

FEATURES

PCAnywhere 8 ■ CoSession Remote 1 ■ EasyLink ■ InterBack 1.2 ■ Look@Me 1.0 ■ Mailtreeve ■ PowerTerm 5.1 ■ Proxy 2.2 ■ Remote DeskLink 7.5 ■ Remotely Possible/32 4.0a

REVIEWS

1st Contact 1.08.00 ■ AUSTUDY Calculator ■ A_Line of Credit 1.1.1 ■ A_Pay 3.0.1 ■ Above & Beyond 98 ■ Ace Contact Manager 3.5.2 ■ Adr_Book 5.21 ■ Advanced Point of Sale 5.23b ■ Assets Register ■ Australian PAYE Tax Calculator 1.05 ■ Australian StockEasy ■ Bottom Line Accounting 3.1 ■ Budget Planner 3.2 ■ Budget for Success 2.17 ■ CheckMate Plus 2.02 ■ Cheque-Book 5.0.15 ■ Chronilist 2.5 ■ Client Tracks 2.5 ■ CoSession Remote 1.0 ■ Commodity Trader's Helper 1.0 ■ Compare the Banks 2.2 ■ Contact Browser 4.3.1 ■ Contact Plus Personal 97 2.2 ■ Contact Tracker Pro 1.0 ■ Contacts 3.0 ■ Expense Report 98 2.0 ■ Home/Office Inventory Book 4.5 ■ Income Tax Estimates ■ Instant Invoices SE 2.2 ■ Integra Office 2.5 ■ Intelligent Investment Assistant Lite ■ Investors Toolbox for Windows 95 2.17 ■ Invoice 98 1.501 ■ Loan*Calculator Plus 2.1b ■ Microsoft Money 98 Financial Suite Test Drive ■ Money Smith 95 ■ Mortgage Wizard Plus 4.3 ■ Mortgage and Finance Pro 2.0 ■ Owl Simple Business Accounting 1.10 ■ Power Accounting 5.01 ■ Prescribed Payments Management System 1.00 ■ Product Inventory & Sale Tracker ■ QuickBooks 4.0 fully-functional version ■ Schedule Wizard 98 1.6e ■ Small Business Inventory Control 32 3.0 ■ Small Business Invoicing and Inventory 1.0 ■ Smart/Register 3.6 ■ SmartTax 97 Lite ■ Sybiz Vision Accounting Demonstration Program ■ Tax Installment Deduction Calculator 1.0 ■ Time & Chaos32 5.3.31 ■ Top Ten 1.0.2 ■ Tripwire ■ Universal Mortgage and Loans 2.17 ■ Value Trend Indicator 4.17 ■ Vulcan FinanceCalc 1.1 ■ WebSite Pro 2.0

WORKSHOP

Windows 95 Formula Graphics Multimedia System R97.10.1 ■ 1 Cool Button Tool 1.2 ■ MegaDraw Pro 5.01 ■ LifeTrax 2.11 OS/2 NcFTP ■ PMCrypt 1.00.00 ■ SSH for OS/2 03 (port) 1.2.13 (app) ■ The Secure Workplace for OS/2 4.52E ■ Workplace Security for OS/2 2.1.5 Linux Logsurfer ■ Lsof ■ SSH ■ Tiger Mac BladePro ■ Furbo Webmaster ■ ImageVice 1.1 ■ PhotoGIF Lite ■ RetroScan

BANDWIDTH BUSTERS

NetObjects Fusion 3 ■ Paint Shop Pro 5

BROWSERS

Microsoft Internet Explorer 4.01 ■ Microsoft Internet Explorer 3.02 ■ Netscape Communicator 4.05 ■ Netscape Navigator 4.05 ■ Netscape Navigator 2.02 International Version

NET KIT

ARJ 2.55 ■ Adobe Acrobat Reader 3.01 ■ Anarchie 2.0.1 ■ CRT 2.0 ■ EMX Ping ■ Finger 1.5 ■ Forte Free Agent 1.11 ■ Gibbon Finger ■ IRCLE 3.0 ■ InterNews 2.0.2 ■ LA Gopher 1.1 ■ LHA 2.55b ■ LHARC 2.22 ■ Mac Ping 3.0.2 ■ MacBinary II 1.0.1 ■ MacGZIP 1.1 ■ NCSA Telnet 2.7b4 ■ McAfee VirusScan ■ Open Chat/2 1.06 ■ PKZip ■ PMZipper 1.4 ■ Post Road ■ PowerZip 3.51 ■ RAR Archiver ■ Stuffit Expander ■ Turbo Gopher VR 2.1a4 ■ WS Archie ■ WS Finger ■ WSGopher ■ WS_Ping ■ WinPack ■ WinZip 6.3 SR-1 ■ mIRC 5.31

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operating systems
Tips for installing Windows
Windows programming 101
Plus: Mac, Linux, OS/2,
JavaScript, Hypertext and
Shareware

In this month's CD**OUR MONEY & YOUR LIFE**

Personal finance software
Personal information
managers
Investment and stock
market tools
Taxation
Business accounting
Stock and inventory tools
Ecommerce

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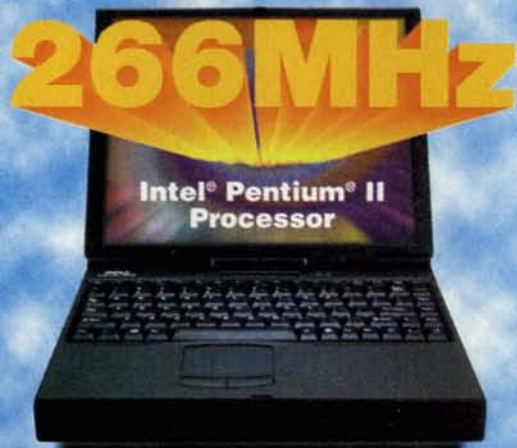
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Aspirational fish

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By Jeremy White

I've been to a few publishing conferences over the years. Only one speech has ever stuck in my mind, however. It was given earlier this year by Brad Boxall, the editor in chief of *People, Picture* and *Sextra*.

Now you might not think that *People* and *APC* would have much in common. But they share one critical thing: their readers own them.

Brad's talk was about — for want of a better phrase — aspirational fish, or what readers look for in a magazine. He told the story of a fishing magazine. The magazine had a rule, religiously adhered to, that every issue had to have a picture on the cover of a man holding a fish. Not just any fish. The fish had to be just the right size — not so big as to be too difficult to catch, and not so small that it was easy. Once a year the editor would go on a marlin fishing junket off the northern coast of Australia, and the next month run a cover picture of a marlin jumping out of the sea. And every year, the copy sales would go through the floor, because, Brad said, the editor might have gone marlin fishing, but his readers didn't go with him.

Brad went on to argue that a magazine is like a clubhouse for its readers: you can introduce new beer mats or glasses, put some new pictures up, or rearrange the furniture. But if your readers don't like it, watch out, because it's their clubhouse.

The reason why I retell this story is because we've got some ideas for rearranging the furniture. And we'd like to know what you think!

Over the past two years *APC* has been through a whole host of changes. We've changed from being 80% US rehased material to 100% Australian. We've put in Australia's only true computer products testing labs, costing over \$1.2 million. We've pioneered worldwide the concept of a three-way magazine with integrated and

equally important cover CD, paper edition and Web site. And we created the concept of using a Web interface for a CD magazine. We've doubled the total amount of content we deliver to our readers, and roughly half of the content we produce is now delivered electronically. We offer daily news and reviews on the site, an email newsletter, and more pages of Australian product reviews in Australian conditions than any other magazine.

And you have responded enthusiastically, telling us directly what you like and don't like, where we've done well and where we can do better. Newsstand circulation has doubled and we now sell more than 70,000 copies of our best editions, readership is up over 250,000, and our Web site usage has grown from 10,000 to more than 320,000 real people every month.

But we know from the feedback we get that we have to do better still. Our competitors copy our innovations and we lose our market edge; new and well-executed titles enter the market at much lower cover prices based on the model of lifting overseas (UK and US) content. And what was a clever innovation yesterday is just standard for computer magazines today.

Our most recent reader survey tells us that while 87% of our readers think that the magazine is very good or excellent, nearly half want significantly more Workshop, and 40% want more reviews. Our readers want more material on the CD, and they want it to be more up-to-date and more timely. And they say to us they are prepared to pay more money for more content — 65% for a second CD, 62% for more Workshop and 41% for more reviews. But equally, anecdotally we get the feeling many believe that, however good value *APC* might be perceived to be, \$8-odd is just too much to pay for a magazine. At the same time, readers spend an average of 6.27 hours reading each issue,

and use the CD several times a week and the Web site a little less.

Readers seem to be telling us that they want more content, but for a lower cover price, and perhaps in smaller 'chunks'. We've even had feedback suggesting that if we cut the cover price, readers would buy a lot more issues per year.

Over the past five years, there has also been a sea change in the computer advertising market. The number of magazine ad pages booked in *APC* has roughly halved. We've consolidated all the retail and price-based advertising together at the back of the magazine — at significant reader request — so they don't break up articles. But the percentage of advertising in the main section has dropped from roughly 50% to 30% an issue. At the same time, new inserted retail catalogues have appeared. We don't print these or pay for their production, they're just inserted booklets, and unlike our competitors we don't include these catalogues in our page count. We get a very polarised response to them, however: 48% of readers find them useful, 10% want to see more of them, while 30% don't want them, and some readers hate them passionately.

I think that part of the problem is that some readers think they are paying a high cover price to pay for printing these catalogues, but because we don't print them — they're just inserts — in fact the opposite is true. They provide ad revenue that allows us to run more editorial pages, and keep down the percentage of ads in the main part of the magazine splitting up articles.

We're in the process of putting together the feedback we get, such as our Reader Survey, with the anecdotal feedback we get, especially emails sent to me.

So email me your thoughts, or visit <http://apcmag.com/mymag> and tell us how to improve and do a better job of giving you the information and analysis you find most interesting and useful. ■

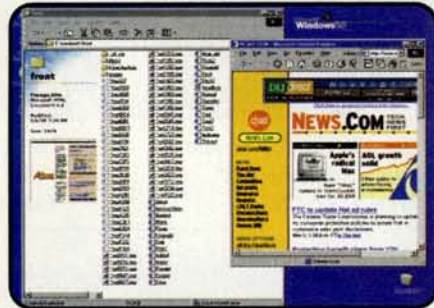
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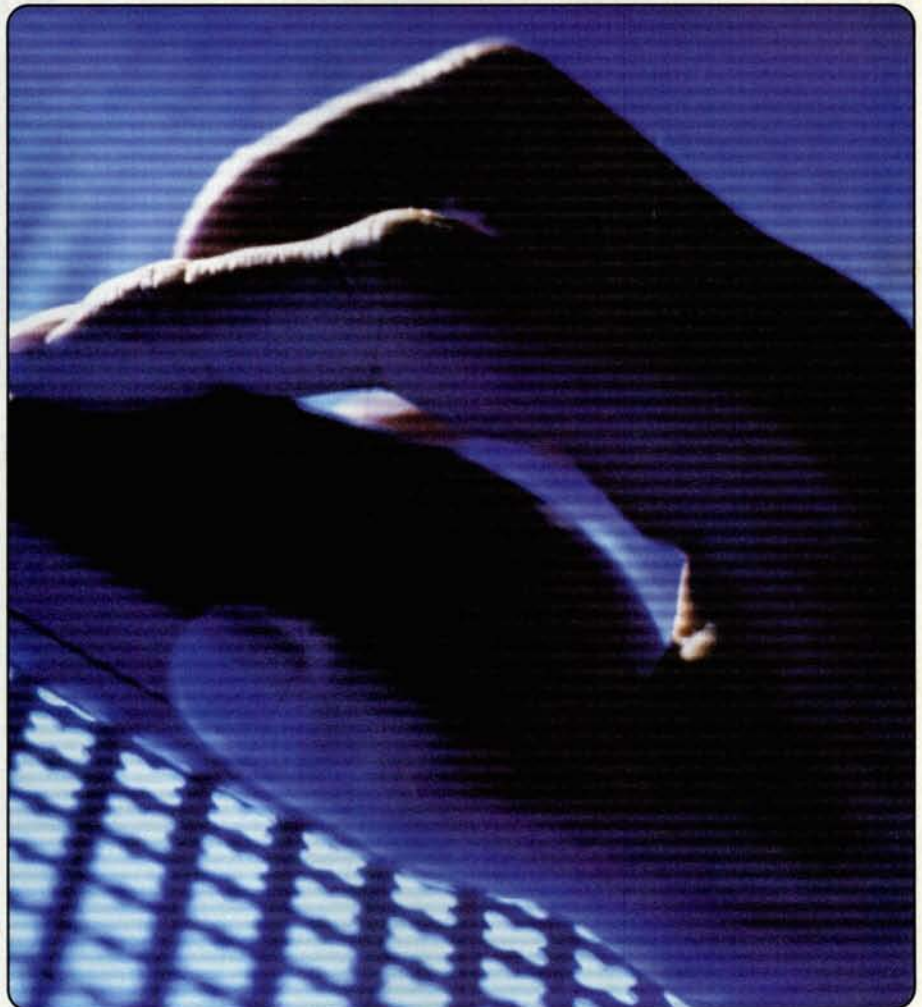
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Wealthy and Wired

Personal financial management is about as close to a killer application for PC and Internet in the home as you're likely to find. This month's feature examines its potential, reviews personal finance software, looks at financial advice and investment sites, and explains the ecommerce phenomenon.

By Jeremy White



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WEALTHY AND WIRED

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WHAT'S GNU? FREE SOURCE CODE

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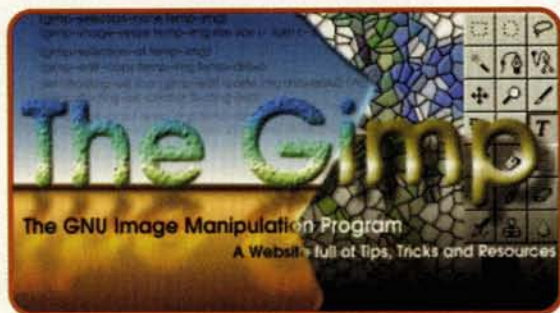
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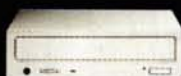
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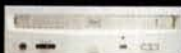
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CD-R Drive



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 - **Service and reliability:** Our annual survey on who you can trust to take care of your computing needs
 - **Navigator 5 and IE5**
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THE FINAL COUNTDOWN

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Once your money's sorted out, get your life in order and manage your calendar, contacts and to-do lists with one of 14 top PIMs.

As usual, our crack **apcmag.cd** team has trawled the Net for the latest and greatest software for you to test. Linux users: check out the infamous Gimp! Also this month we have Netscape Navigator 4.05, Paint Shop Pro 5 and QuickTime 3.

New & Hot

Arachne 1.2 (final beta) ■ AutoZip 98 2.2 ■ CopyPaste 1.5 ■ Launch Board 2.0 ■ NetSonic 1.0 ■ PowerBar 1.6 ■ RZSplit 2.1a ■ Safety Net Pro 6.4 ■ SciTech Display Doctor 6.51 ■ Task Menu 2.0 ■ interMute

Mobile Survival Toolkit

EasyLink ■ InterBack 1.2 ■ Look@Me 1.0 ■ Mailtree ■ PowerTerm 5.1 ■ Proxy 2.2 ■ Remote DeskLink 7.5 ■ Remotely Possible/32 4.0a

Reviews

1st Contact 1.08.00 ■ AUSTUDY Calculator ■ A_Line of Credit 1.1.1 ■ A_Pay 3.0.1 ■ Above & Beyond 98 ■ Ace Contact Manager 3.5.2 ■ Adr_Book 5.21 ■ Advanced Point of Sale 5.23b ■ Assets Register ■ Australian PAYE Tax Calculator 1.05 ■ Australian StockEasy ■ Bottom Line Accounting 3.1 ■ Budget Planner 3.2 ■ Budget for Success 2.17 ■ CheckMate Plus 2.02 ■ ChequeBook 5.0.15 ■ Chronilist 2.5 ■ Client Tracks 2.5 ■ CoSession Remote 1.0 ■ Commodity Trader's Helper 1.0 ■ Compare the Banks 2.2 ■ Contact Browser 4.3.1 ■ Contact Plus Personal 97 2.2 ■ Contact Tracker Pro 1.0 ■ Contacts 3.0 ■ Expense Report 98 2.0 ■ Home/Office Inventory Book 4.5 ■ Income Tax Estimates ■ Instant Invoices SE 2.2 ■ Integra Office 2.5 ■ Intelligent Investment Assistant Lite ■ Investors Toolbox for Windows 95 2.17 ■ Invoice 98 1.501 ■ Loan*Calculator Plus 2.1b ■ Microsoft Money 98 Financial Suite Test Drive ■ Money Smith 95 ■ Mortgage Wizard Plus 4.3 ■ Mort-

gage and Finance Pro 2.0 ■ Owl Simple Business Accounting 1.10 ■ Power Accounting 5.01 ■ Prescribed Payments Management System 1.00 ■ Product Inventory & Sale Tracker ■ QuickBooks 4.0 fully-functional version ■ Schedule Wizard 98 1.6e ■ Small Business Inventory Control 32 3.0 ■ Small Business Invoicing and Inventory 1.0 ■ Smart/Register 3.6 ■ SmartTax 97 Lite ■ Sybiz Vision Accounting Demonstration Program ■ Tax Installment Deduction Calculator 1.0 ■ Time & Chaos32 5.3.31 ■ Top Ten 1.0.2 ■ Tripwire ■ Universal Mortgage and Loans 2.17 ■ Value Trend Indicator 4.17 ■ Vulcan FinanceCalc 1.1 ■ WebSite Pro 2.0

Workshop

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Bandwidth Busters

NetObjects Fusion 3 ■ Paint Shop Pro 5

Browsers

Microsoft Internet Explorer 4.01 ■ Microsoft Internet Explorer 3.02 ■ Netscape Communicator 4.05 ■ Netscape Navigator 4.05 ■ Netscape Navigator 2.02 International Version

Net Kit

ARJ 2.55 ■ Adobe Acrobat Reader 3.01 ■ Anarchie 2.0.1 ■ CRT 2.0 ■ EMX Ping ■ Finger 1.5 ■ Forte Free Agent 1.11 ■ Gibbon Finger ■ IRCLE 3.0 ■ InterNews 2.0.2 ■ LA Gopher 1.1 ■ LHA 2.55b ■ LHARC 2.22 ■ Mac Ping 3.0.2 ■ MacBinary II 1.0.1 ■ MacGZIP 1.1 ■ NCSA Telnet 2.7b4 ■ McAfee VirusScan ■ Open Chat/2 1.06 ■ PKZip ■ PMZipper 1.4 ■ Post Road ■ PowerZip 3.51 ■ RAR Archiver ■ Stuffit Expander ■ Turbo Gopher VR 2.1a4 ■ WS Archie ■ WS Finger ■ WSGopher ■ WS_Ping ■ WinPack ■ WinZip 6.3 SR-1 ■ mIRC 5.31

GameZone

Lords of Magic ■ SODA Off-Road Racing

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SPECIAL REPORT

Tough times for PC makers

Struggling for profits

With the year almost half over, the outlook is decidedly mixed for PC manufacturers; all the signs suggest that while sales will continue to grow, turning a profit is going to be harder than ever.

The most visible indicators of this trend are the mixed financial results from the major players in the sector. A frequently cited example is Compaq, which saw its net income for the first quarter plunge by almost \$US400 million compared to the same period last year. Compaq has predicted it will take until the third quarter for results to improve.

Falling sales are also hitting component manufacturers, reflected in declining revenues at Intel. While first-quarter revenues are traditionally lower than the preceding fourth quarter, which catches Christmas sales, Intel's first-quarter revenues of \$US6 billion are also down 7% on the same quarter last year. More tellingly, its first-quarter net income of \$US1.3 billion is down 36% from the same period last year.

Continued on page 18

Aussie PCs on the ropes

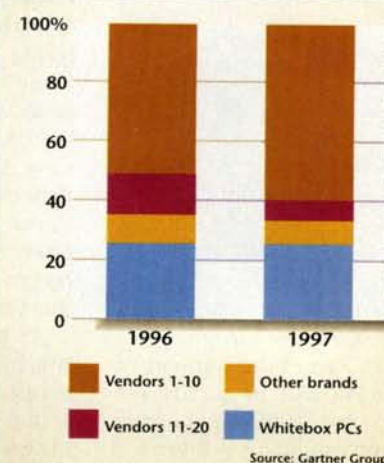
PC sales in Australia are continuing to grow, but profits are down and the local manufacturing sector has virtually disappeared.

The Australian PC market saw 1.6 million machines sold and vendors receiving \$4.4 billion in 1997, according to the Gartner Group. The figures represent an 11% growth in sales, but revenues have actually declined from the previous year.

The PC market has now matured and most purchases are to replace existing machines, Gartner's PC industry analyst Bruce McCabe said. As a result, sales growth is unlikely to break 15% over the next five years. The Asian economic crisis will also begin to dampen sales in the coming year, he added.

Compaq remains the Australian market leader with 8.8% of sales, followed by IBM with 7.5%, Ipex with 5.4%, Toshiba with 5.1%, and Apple with 5.0%. "A full third of the market is owned by the top five vendors," McCabe said, noting that such consolidation is likely to continue. "Efficiency and scale are important in every part of the PC industry. Margins are shrinking, prices are falling and there's an extremely high cost of market entry for new players."

PC revenues



The Australian market does not yet closely align with global sales trends in terms of companies. Dataquest's figures for worldwide PC sales in 1997 rank Compaq in the lead with 12.4%, followed by IBM with 8.8%, Dell with 5.6%, Hewlett-Packard with 5.4%, and Packard Bell/NEC with 4.8%. These rankings held firm in the

Continued on page 18



News Roundup

As promised in the last Federal budget, the Government has sold off its Australian Multimedia Enterprise. Venture capital manager Allen and Buckeridge has taken charge of the investor through a \$13.3 million share-buyback scheme.

The sale process, which has taken longer to be completed than expected, began in September last year. Allen and

Buckeridge's purchase of the AME may be a surprise to some: it was reported in the press recently that the firm had pulled out of the bidding race, but director Roger Allen said "sometimes people get things wrong". The Australian Financial Review reported the firm had decided AME's business model was incompatible with its own.

Restructuring would need to take place, said Allen. The AME held funds of \$45 million, but about \$30 million has been taken out and placed back in govern-

ment hands (\$13.3 million through the sale and \$16 million in uncommitted cash was taken back in March). He said that while substantial restructuring was needed because of this, core staff would remain. One condition of the sale was that all existing legal obligations be honoured.

The disputes on Australia's waterfront have yet to significantly impact the local IT industry. The Australian Information Industry Association (AIIA) recently conducted an email survey and found that only one of

The struggle for profits

Continued from page 17

In March, Intel announced that its sales for the quarter were likely to be below expectations, citing flattened PC sales. "The PC industry seems to have gotten ahead of itself, building more product than end customers pur-



chased," said retiring Intel CEO Andrew Grove (pictured). Part of the company's response will be to lay off staff, with 3,000 slated for retrenchment over the next few months. Despite this, revenue for the second quarter may be lower than this quarter, Intel officials warned.

It's not all a downhill struggle; the freshly rebranded Gateway recently posted bumper results, with sales up 38% from the previous year. Apple is also continuing its resurgence with two quarters of consecutive profitability.

PC manufacturers aren't pretending there's an easy fix to their current problems. Dataquest has predicted the overall global market for PCs will grow by 15.6% to 93.1 million units this year. Revenues, however, are not on the same upward trajectory, with the research company predicting growth of just 6.4% to \$US166 billion this year.

Those figures also conceal some significant global variations. For instance, while the US remains the single largest global market, it is also the hardest hit by the recent sub-\$1,500 PC craze. Some recent market figures suggest that 50% of sales in the US fall into this high-volume, tight-margin category. Reflecting that trend, Dataquest is predicting sales growth of 16% for the US, but revenue growth of only 3% this year.

In the Asia-Pacific region, the impact of the regional economic crisis has seen some markets boom while others stagnate or decline. Nonetheless, overall growth of 23% to 11.8 million units is expected, and revenue growth of 17% for this year may offer some compensation to the cash-strapped US majors. Europe offers a similarly balanced equation, with 8.9% revenue growth and a 14% increase in sales.

Angus Kidman

Aussie PCs on the ropes

Continued from page 17

first quarter of this year, although several of the companies increased their percentage market share.

The appearance of Toshiba and Apple in the Australian top five is largely explained by their near-dominance of their market niches, McCabe said, and this will be difficult to sustain in the foreseeable future. Both companies also have a much

The Australian market is yet to be significantly impacted by the emergence of sub-\$1,500 machines from major players.

longer-established presence in the Australian market than firms such as Gateway and Dell, which have been the main beneficiaries of global market consolidation in recent years.

The main victims of that trend have been Australian PC companies, which now account for only 32% of total revenue in the local market. McCabe said the only likely long-term survivors will be

Ipex, which has a strong corporate presence, and Edge Technology, which maintains a healthy OEM market among small 'white box' suppliers. Ipex is the only company to currently appear in the top 10 list of sellers, although as recently as 1995 there were four Australian companies in the list (Ipex, Osborne, Optima and Total Peripherals).

Research from Inform Business Development shows that 26% of Australia's 3,655 first and second-tier channel companies (retailers, resellers, distributors and VARs) assemble their own PC lines.

Collectively, these resellers may account for a large proportion of the IT market, but individually their volume is small. Of the companies building PCs, 83% assemble fewer than 100 systems per month, with a further 11% building between 101 and 300 PCs a month.

McCabe said the 'white box' market is likely to shrink rapidly as a result of moves by the Australian Taxation Office to cut sales tax evasion in the sector, which has been a major factor in price competitiveness for some smaller firms.

The Australian market is also yet to be significantly impacted by the emergence of sub-\$1,500 machines from major players. Sub-\$1,500 sales have quickly become a major force in the US market, a phenomenon which has seen sales soar.

Angus Kidman



News Roundup

the 50 IT companies contacted had been affected by the dispute. Most firms said they used air rather than sea freight (a consequence of rapid change in technology industries), and software companies had the additional option of obtaining and distributing software online.

Companies in the survey identified a number of potential problems if the dispute continued, including a possible increase in

component costs, increased competition for air freight capacity, and the creation of an adverse image of Australia in overseas markets. On the plus side, a long-running dispute would devalue the Australian dollar, making it easier to attract export business, companies said in the survey.

EnergyAustralia plans to construct a 1 Gbps network linking NSW universities with the Australian Technology Park at Redfern in Sydney, using fibre-optic cables slung along power poles. The network has

been dubbed the Photonics Information Super Corridor (PISC), and mirrors the Internet II high-speed backbone currently planned in the US. Like Internet II, PISC is intended to alleviate the bandwidth congestion experienced by institutions using the standard Internet, and allow greater sharing of costly supercomputing resources across campuses.

Wang Global has lost a patent suit against Netscape, claiming key elements of the Navigator browser infringe a

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SGI SIGNS ON

Intel bets on business

As Intel's market differentiation strategy takes shape, its future success appears to be relying more and more heavily on the business market.

Intel quickly followed up its release of the low-end Celeron (see our review on page 31), by announcing plans for a processor line aimed at the high-end market. The Xeon



processor, a Pentium II aimed at high-end workstation and server markets, is scheduled for a mid-year release.

The move is part of an ongoing Intel plan to develop processor brands for individual markets, rather than relying on a single main product line. However, the plan has already undergone at least one hiccup, with take-up rates for Celeron among major manufacturers lower than expected. Industry analysts have identified the Celeron as

a crucial release for Intel, which is facing heavy competition from rivals AMD and Cyrix, and has seen its profits decline for the first time in several years.

Most criticism of the Celeron has centred on its relatively poor performance. "We're lukewarm [about it]. We will wait for the next few iterations and then see," Gateway's Australian manager Peter Lees told APC.

A recent business coup for Intel was the announcement that Silicon Graphics (SGI), which has long relied on its own MIPS processors, will begin manufacturing Intel-based systems this year. SGI will develop workstations based on the current IA-32 platform and will port its 64-bit Irix operating system to Intel's Merced platform, which is to debut in 1999.

Although it still maintains a strong market presence in the engineering, CAD, and special-effects markets, SGI (system pictured) has been plagued by financial woes in recent months. Analysts have attributed the company's problems to fierce competition from PC vendors, which are building workstation systems using Intel processors and Microsoft's Windows NT.

**Angus Kidman and
Selina Mitchell**

SHORT ATTENTION SPAN

Holding the crowds online

Although estimates of the total number of Internet users continue to grow, competition to hold their attention once they get online is becoming tougher and tougher.

The Web population, which in 1997 numbered 82 million, is estimated to reach 329 million by 2002, according to new figures from IDC Research. A recent review of the overall communications market by Paul Budde Communication found that the number of Web sites in Australia is currently 30,000, up from 18,000 last year. Xerox research estimates the total number of sites globally is in excess of 2 million.

However, only a fraction of those sites are successfully drawing an audience. A survey by Xerox researcher Dr Jim Pitkow found a mere 1,554 sites are targeted by 50% of all visits to the World Wide Web. Also, 40% of users do not go any deeper than a site's main page when they visit it.

The same phenomenon can also be seen in online chat rooms. According to the Guinness Book of Records, the largest number of visitors

ever recorded in a chat room is 2,000, a record held by the BBC. NineMSN, the joint venture between Microsoft and PBL (publisher of APC), claims to have beaten that figure, citing 2,511 visitors to an online chat with rock group Metallica on April 4, 1998.

Whether or not NineMSN succeeds in the attempt, the numbers clearly pale next to other popular media, interactive or otherwise. For instance, 'Blue Heelers', Australia's most popular local TV show, has a regular audience in excess of 3.1 million.

While Internet access does not have anywhere near the universality of television, numbers such as those cited by NineMSN are clearly only a small proportion of the estimated 25% of Australians who are online, and a drop in the ocean of the potential global audience of Net users.

Nonetheless, the concept of chatting clearly remains popular. For instance, ICQ claims to have more than 10 million users of its namesake software, which notifies users when people they know are online.

Angus Kidman



News Roundup

video text system patent issued to Wang in 1984. Wang asserted the patent covers the ability to bookmark functions, to save Web pages retrieved from a server using the 'Save As' command, and the ability to save a file with file extensions and subsequently retrieve the file and decode it based on the extension. However, a US judge dismissed the case, citing

differences between Net and video text systems.

The Australian Communications Authority is to conduct a review to determine whether the universal service obligation should be extended to include access to 64Kbps digital data services. The National Farmers' Federation, which represents the interests of many Australians living in isolated and rural areas, has flagged its support for the review, adding that it would like to see reviews held every five years.

Complete versions of these stories can be found on the apcmag.com Web site. For regular updates on what's happening in the world of computing, check out our breaking news stories throughout the week at <http://apcmag.com/news>. And don't forget our weekly Highlights from the Wire roundup, posted every Monday at <http://apcmag.com/direct> and available via email.

Intel Celeron

It's probably fair to say that the IT industry was by and large underwhelmed when Intel launched the Celeron, its new processor targeted at the under \$US1,000 PC market. It was Intel's response to the ground being made by its main competitors — Cyrix and AMD — in this market segment. Earlier Intel processors, particularly those based on the P6 core, were way too expensive to be used in this kind of system.

Intel's plan: strip out the level 2 cache of the Pentium II processor, thus decreasing manufacturing costs, and sell it at lower prices to consumers. However, the Celeron is not much cheaper than Intel's other processors. According to the company's official pricing list, the Celeron 266MHz sells for \$US155 in quantities of 1,000. By comparison, the Pentium II 233MHz sells for \$US198 in similar quantities. There is even less distinction in the street pricing. Taking a quick glance at Computer Market Online (<http://www.computermarket.com.au>), we saw that the Pentium II 233MHz sells for \$410, only \$10 more than the price of the 266MHz Celeron from the same seller.

The real crunch, however, comes when you compare the prices with the price of the good old Pentium MMX. A Pentium MMX 233MHz officially costs \$US134 in quantities of 1,000, \$US21 less than the Celeron (Computer Market Online listed its price at \$285 at the time of writing). So while the

sor by 17 points with a score of 406, despite the 66MHz clock speed difference. Fortunately, in the floating point tests the Celeron showed its mettle with a score of 1,243.33 — far higher than the Pentium's 790.

So what does this mean? If you plan to primarily run office applications, most non-3D games and the majority of other PC applications, then a Pentium MMX is still probably the way to go (and is likely somewhat cheaper). However, certain applications such as 3D games and high-precision applications which rely primarily on floating-point operations will benefit from the Celeron (although some 3D games are known to be 'cache-intensive', and will not perform so well on Celeron processors).

Despite the lack of L2 cache, the Celeron comes packaged in a Slot 1 cartridge form, and can be used on motherboards utilising the LX, BX or EX AGP chipsets. The latter of these, the EX chipset, was actually launched in conjunction with the Celeron, and Intel is positioning low-cost EX chipsets as the ideal companion to the Celeron processor. The EX chipset is essentially a trimmed-down version of the LX chipset — supporting AGP, UltraDMA and SDRAM — but expansion slots are limited to only two DIMM and three PCI slots. It does not support the 100MHz front-side bus of the BX chipset, being limited to only 66MHz, like the LX chipset.

If Intel hoped to leverage its brand name to sell a lot of these processors, then it was sorely mistaken. At the time of writing, only a very few tier-one vendors had announced any machines using the processor (Acer looks like being the first to market), and most of the major accounts that Intel had hoped to win back (Compaq and IBM are notable among these) stuck with the AMD and Cyrix processors they were using in their lower-end machines.

The reason everybody was so unimpressed by the Celeron? It brings nothing new to the party, having few real advantages over Intel's competitors or even its own standard Pentium chips. Unlike the Cyrix MediaGX processor, the Celeron incorporates no new function onto the chip, so the peripheral component cost of the system remains the same. And the AMD-K6 can be credibly said to challenge Intel's mid-range chips on performance, but sell at a much lower price.

Intel will attempt to rectify the situation later this year. The company is rumoured to be planning the release of a processor cur-

Test results

	Celeron ¹	Pentium MMX 200 with 512K cache ²
CPUMark32	389	406
FPU Mark	1,243.33	790

1. Intel custom system, a single Intel Celeron 266MHz, 32M RAM, Ultra ATA hard disk, ATI Tech. Rage Pro Turbo graphics controller, FAT32 file system. Tested at 1,024 by 768 resolution with 256 colours. Running Windows 95 OSR2 using system cache with access to all available memory.

2. A Digital PC 3000, a single Pentium MMX 200MHz, 32M RAM, 512K L2 cache, IDE hard disk, S3 Trio64V2 graphics controller, FAT32 file system. Tested at 800 by 600 resolution with 16-bit colour. Running Windows 95 OSR2 using system cache with access to all available memory.

Both products used in this test were shipping versions available to the general public. These tests were performed without independent verification by Ziff-Davis, and Ziff-Davis makes no representations or warranties as to the results.

rently operating under the codename 'Mendocino' — a Celeron processor with a small (probably 128K) level 2 cache. Hopefully this will overcome some of the performance problems plaguing the Celeron. Other rumours doing the rounds are of an upcoming processor called 'Whitney', which, like the Cyrix MediaGX, will incorporate graphics (probably i740) and north bridge functionality into a single chip or cartridge. When, and if, these new processors appear, they may well give Intel a decent crack at low-end, lowest-cost processors.

Nathan Taylor



Celeron certainly isn't the cheapest of Intel's processors, Intel is pushing the P6 core, with its improved floating point and 32-bit performance, as its primary selling point.

We tested both a Pentium MMX 200 (street price at Computer Market Online: \$205), running with a 512K level 2 cache, and the Celeron processor, and came up with some very interesting results. Running WinBench 98 CPUMark32, the Pentium MMX 200 actually beat the Celeron proces-

Intel Celeron

■ Distributor	Intel
■ Phone	(02) 9937 5800
■ Online	http://www.intel.com.au
■ Price	\$US155 in quantities of 1,000
■ In short	A rather poor attempt to shore up Intel's slightly diminished market share in the lowest-cost PC segment.

Adobe Photoshop 5

When Photoshop 4 shipped, we could find only one major deficiency: it was only possible to 'undo' the most recent command. To revert to an earlier stage of the image you had to scrap all your changes and start again. Adobe program designers have finally addressed this issue in Photoshop 5 but, characteristically, they haven't just added multiple undo, they've produced a sophisticated solution that allows you to do much more than just correct mistakes.

APC tested a late beta version of the product. As you work, Photoshop creates a history list of all the steps that have been made. Using the list you can delete single or multiple steps, and you can also select an early state of the image and take a snapshot of it without undoing subsequent changes. The new History brush allows you to 'paint' earlier stages over more recent ones. So if you liked the way one corner of your image looked before the last 12 filters and transformations, you can simply paint the earlier image over the more recent one. The history list and the resulting unlimited capacity for experiment would probably be enough on their own to persuade most users to upgrade, but there are many other tempting new features.

Type formatting has been significantly improved. Text can now be vertical as well as horizontal, and although you still have to enter text in separate dialog boxes (as in earlier versions), you now get a preview of your text in the document window, and it can be repositioned and scaled before you close the text dialog box. What is even better is that individual characters can be formatted directly — they can be rotated and the font, size or tracking changed (previously, you had to create numerous separate pieces of text to achieve these sorts of effects). Perhaps the best new text feature is that text layers remain editable, so if you need to change type after you've set it, you can simply double-click on the type layer and edit it, instead of deleting it and starting again.

As well as the new editable type layers, there are new layer effects such as drop shadow, emboss and bevel. These are par-

ticularly useful for creating type effects and can be applied to any layer. Creating effects like drop shadows is hardly new in Photoshop; you've always been able to create them manually and there are numerous third-party plug-ins which create these effects instantly. What makes these new layer effects really exciting is that they are what Adobe calls 'live' effects, which means if you update the image, the effect automatically updates as well. Previously, if you added a drop shadow to type and then changed that type, you had to delete the whole layer



and start again. Now if you change the type, the drop shadow or bevel will instantly change as well.

There are also new plug-ins. The Automation plug-in allows third-party developers to create wizards to automate complex steps and guide a less-than-expert user through them. There are samples included, such as 'export transparent image' and 'resize'. The latter streamlines the potentially tricky business of specifying resolution when changing an image's size or transforming a printed image into a Web-ready one.

Another new plug-in is 3D Transform, which allows you to 'wrap' images around basic 3D shapes and then transform them, so as to create the illusion of a different viewpoint. As long as your expectations are suitably modest, you may find this useful, but its features are pretty limited.

There are also fairly extensive changes to the way colour calibration is carried out. Photoshop now supports International Colour Consortium (ICC) colour profiles — the same system used by both Apple's ColorSync and Microsoft's new ICM 2.0 system (which is intended to appear in Windows NT 5.0). This approach will improve compatibility between applications and across platforms.

In addition to these major new features are dozens of minor ones. There's a new 'magnetic' lasso, which is a cross between the magic wand (which selects pixels of similar colour) and the old lasso. The magnetic lasso lets you select freehand, but the selection will snap to the nearest high-contrast edge. There's also a magnetic pen which works in a similar way but defines paths instead of selections.

Other more modest, but useful, changes include the ability to preview duotone settings while you're adjusting them, the capacity to align and distribute objects across multiple layers, and the free transform command has been extended to selections and paths, as well as objects. The familiar linear and radial gradients have also been extended to include angular, reflected and diamond.

Sometimes the beta is faster than the final product, because not all the features have been implemented. Sometimes it's slower, because the program hasn't been fully-optimised. With that caveat in mind, we found Photoshop 5's performance very similar to that of Version 4 — a remarkable achievement given the amount of new features.

Jim Endersby

Adobe Photoshop 5

■ Distributor	Adobe
■ Phone	1800 065 628
■ Online	http://www.adobe.com
■ Price	Not yet available
■ In short	Lots of powerful new tools, without forcing users to learn a new interface; nothing short of amazing.

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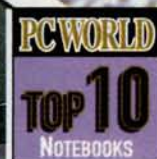
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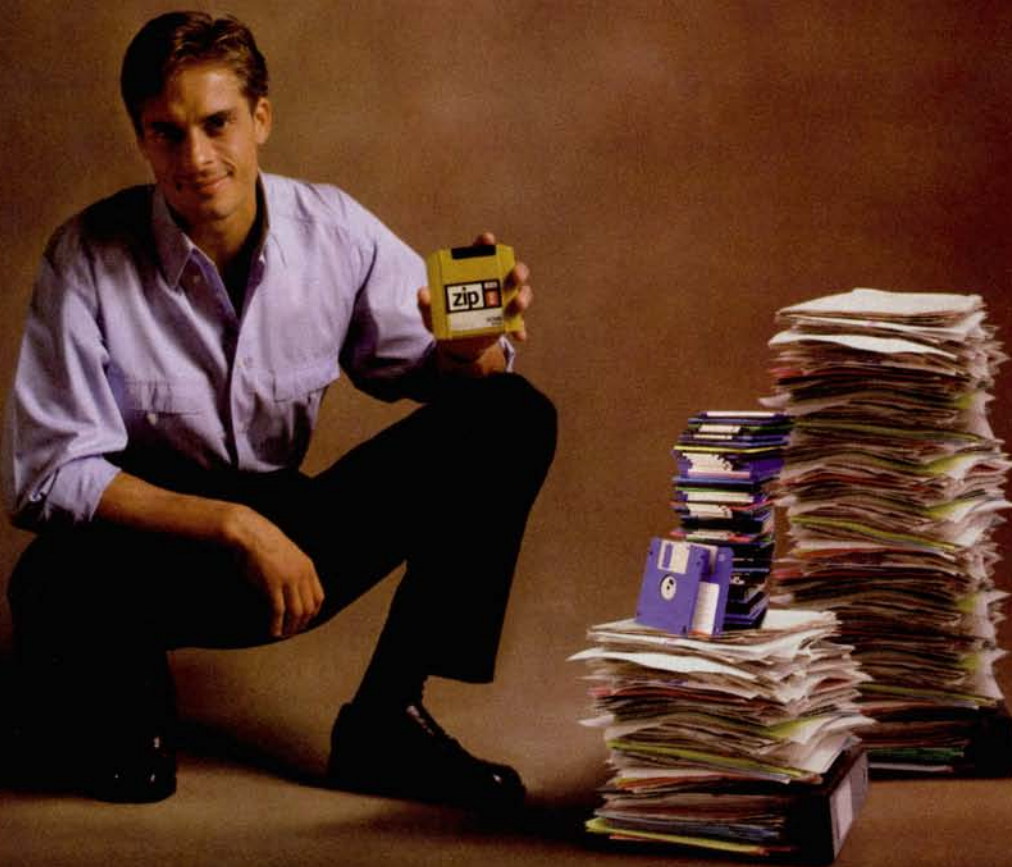
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Both government and business bodies are upping their investment in strategies to counteract the Millennium bug, but can they possibly be ready in time?

Australia gets ready for Y2K



With constant newspaper headlines, hysterical TV reports and even a movie in the works, awareness of the Millennium bug — the inability of older computer software to correctly handle dates past the year 2000 because those dates are encoded using just two digits — could hardly be any higher. Yet with just 18 months left to deal with the problem, many Australian businesses and government agencies are only just beginning to realise the problem may concern them.

In mid-April, the Federal Government announced it would increase funding to help remedy the year 2000 problem, recognising that action within both government agencies and Australian businesses has been far too slow to date.

A total of \$127 million will be spent assisting Commonwealth agencies with remedial action, and to raise awareness of the problem in the wider business community. Industry representatives have warned businesses they should set a deadline to fix the problems within their hardware and software systems by the end of this year, to allow extensive testing before January 1, 2000. As the date approaches, it will become more expensive to rectify Y2K-related problems, and more difficult to find the human resources to perform the necessary work.

"The Government is concerned about the potential for significant international economic and social disruption if appropriate compliance steps are not taken now to remedy the problem," said a joint press release from Minister for Finance and Administration John Fahey and Minister for Industry Science and Tourism John Moore.

The Office of Government Information Technology (OGIT), better known for its past involvement in IT outsourcing and its current coordination of the government's intranet plans, will house the Year 2000 Project Office, which will administer a \$120 million seed fund. The money will be allocated to the most technology-dependent agencies so that key services will operate through 2000.

Another \$2.42 million has been added to the funds already allocated to OGIT to

Swatting the bug

A recent survey by the Australian Society of Certified Practising Accountants found:

- 30% of Australia's top businesses had already experienced Y2K-related problems;
- Most realised Y2K was a serious issue;
- Only 20% have bug-proofed their systems;
- Less than half have begun any type of remedial program.

provide services to agencies, such as third-party auditing of agency compliance, advice on legal and compliance issues, establishing testing environments, and dealing with small agency needs.

The Year 2000 National Strategy, which raises awareness in the private sector and is coordinated by the Department of Industry, Science and Tourism, will have its funding increased by \$4.35 million to almost \$10 million. There will be a national TV campaign to raise awareness of Y2K within the business community.

The Opposition quickly seized on the moves, claiming that the total costs within mission-critical agencies were being concealed under the plan. The government repudiated the claim, but in doing so the extent of the problem became even more starkly apparent.

A statement from Fahey said the current estimate for the cost of Y2K rectification within such government agencies is in the vicinity of \$600 million dollars. A spokesperson for the minister added that it was difficult to estimate overall cost for ensuring compliance among all government agencies, and conceded that not all would be compliant come December 31, 1999.

Part of the reason for the imprecise figures is that government agencies themselves are responsible for identifying Y2K vulnerability. Subsequent rectification costs are allocated out of the agencies' own budgets, making it difficult to esti-

mate the cost of total rectification across government.

Ultimate responsibility for ensuring key agencies are compliant rests with OGIT, which can order an independent audit if evidence indicates an agency is not going to meet the deadline. Several agencies have already undergone voluntary audits, the spokesperson indicated, with OGIT also providing consulting services to those agencies requesting it.

While attention at the big end of town is focused on cost and compliance, a recent survey of 450 small businesses conducted by the Australian Society of Certified Practising Accountants (ASCPA) has found that 78% have yet to spend any money investigating their exposure to the Millennium bug.

Despite this, fewer than one in 10 small businesses have computer equipment that is more than five years old, said CPA executive director Michael McKenna. The newness of the equipment should insulate many businesses against Y2K problems, especially if reputable vendors supplied the equipment in the first place.

Over half of the businesses surveyed said they would be investing in Y2K avoidance anyway, even though more than a third had upgraded software and operating systems in the last 12 months.

Legal issues surrounding the bug are also coming more clearly into focus. Lawyer Ken Crompton told a recent gathering of the Chartered Institute of Company Secretaries in Melbourne that it is vital for firms to come to grips with the problem quickly. Crompton pointed out that company directors failing to meet their legal responsibility to exercise care and diligence can be held personally liable for corporate losses, and that an Australian Securities Commission ruling puts Y2K issues within the scope of that responsibility.

Treating the matter as just a technical issue is a common mistake, he said. It should be regarded as a question of business continuity and survival, with strategic, commercial, operational, financial, legal and insurance ramifications.

Josh Gliddon, Selina Mitchell and Stephen Withers

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It seems everyone but business is convinced of the profits to be made from electronic commerce.

Ecommerce rules?

Australian businesses need to get online and start conducting transactions electronically, or they may not survive. Missing the ecommerce boat could spell economic disaster for individual businesses and also for government, was the warning from business leaders and government representatives to delegates at the Enabling Australia conference in April.

It may, however, have been a case of preaching to the converted. While many of those at the conference realised the potential savings and opportunities that ecommerce can provide, there are still a large number of businesses and organisations that are wary of conducting electronic transactions or supplying Net-based services.

Andersen Consulting's study *eCommerce: Our Future Today*, found that most large companies preferred to adopt a wait-and-see approach to ecommerce. Critical barriers to ecommerce's take-up include a lack of customer demand, a lack of internal ecommerce knowledge and culture, a concern about the need for a regulatory and legal framework, and a perceived lack of government leadership in the area.

Most of those surveyed recognised that electronic business transactions of many kinds would provide substantial benefits for individual businesses as well as the national economy, but most did not see ecommerce as a high strategic priority.

The Yellow Pages Small Business Index, which analyses small to medium businesses, found that many are yet to be convinced of the benefits of ecommerce. The study found that three quarters of small businesses (those with one to 19 full-time employees), and 99% of medium businesses (those employing between 20 and 200) use computers. Of these, one third of small businesses and two thirds of medium businesses are connected to the Internet.

The study found that 95% of businesses with computers were aware that the Internet provided a sales and marketing channel, but only one third believed they could use the Internet to sell their products, and 100,000 businesses (out of about 800,000 in Australia) have set a 12-month time

frame for making a decision on implementing ecommerce. The two major impediments to SMEs taking up ecommerce were listed as cost, and a lack of expertise or technical knowledge.

That there is money to be made from ecommerce was the message at the conference, coming from profitable companies (such as Fedex and Cisco), as well as from the senior adviser on policy development to the US President, Ira Magaziner.

Magaziner quoted a US study showing that one third of real growth in the country's economy is directly related to IT. Revenues from ecommerce will make the profits even more impressive, he said; ecommerce will be as great as the industrial revolution, as it will affect all sectors of the economy.

The Internet is giving information industries new life, said Magaziner. "As the Internet goes from having 100 million people to a billion people over the next decade, we think the importance of information technology industries in our economy is only going to accelerate."

He said that ecommerce is just beginning to have an impact on the US economy, but this was already dramatic. US

waking up Australian businesses and making them aware of ecommerce may have been a success, many at the conference were left unfulfilled, describing the summit as providing a call to arms with no handout of the weapons.

While there was a clear view from the majority of industry and government speakers that governments should not try to regulate or control electronic commerce, the Andersen survey did suggest business was looking for some guidance from government before acting.

So, what next? A continued push from Federal Government to put its services online and more awareness-raising projects from NOIE (the National Office for the Information Economy — the organisers, in conjunction with Telstra, of the Enabling Australia summit). September 5 has been declared Information Economy Day. This will be the centrepiece of a \$3 million information economy awareness campaign.

For business, however, many questions remain unanswered. How do you deal with security and privacy issues? How do you keep those in distribution channels onside while cutting them out



Ecommerce will be as great as the industrial revolution.

business-to-business ecommerce alone will grow from \$US6 billion to \$US300 billion by 2002, he said.

Business-to-consumer (or retail) ecommerce is also growing more rapidly than expected, he said. The largest area of ecommerce, however, will be the digital delivery of products and services across the Internet. He also said a new form of direct marketing is evolving on the Net involving the growing number of community sites of affinity groups.

There was no doubt that in the pomp, ceremony and expense of the summit, ecommerce has reached buzzword status in the minds of the Australian Government — it is seen as a revenue raiser and a job creator. While the summit's aim of

by offering sales direct online? How do you attract customers online? Will it cost your company too much in courier charges?

Amid the verve surrounding the ecommerce summit, one speaker suggested caution. While the majority of speakers at the summit suggested urgent business action was needed, Professor Fred Hilmer said top management should not take a leading role in the process, but should instead help create an appropriate environment.

He added that the ecommerce industry was not necessarily lucrative, and warned of the chaotic and unpredictable nature of Net technologies.

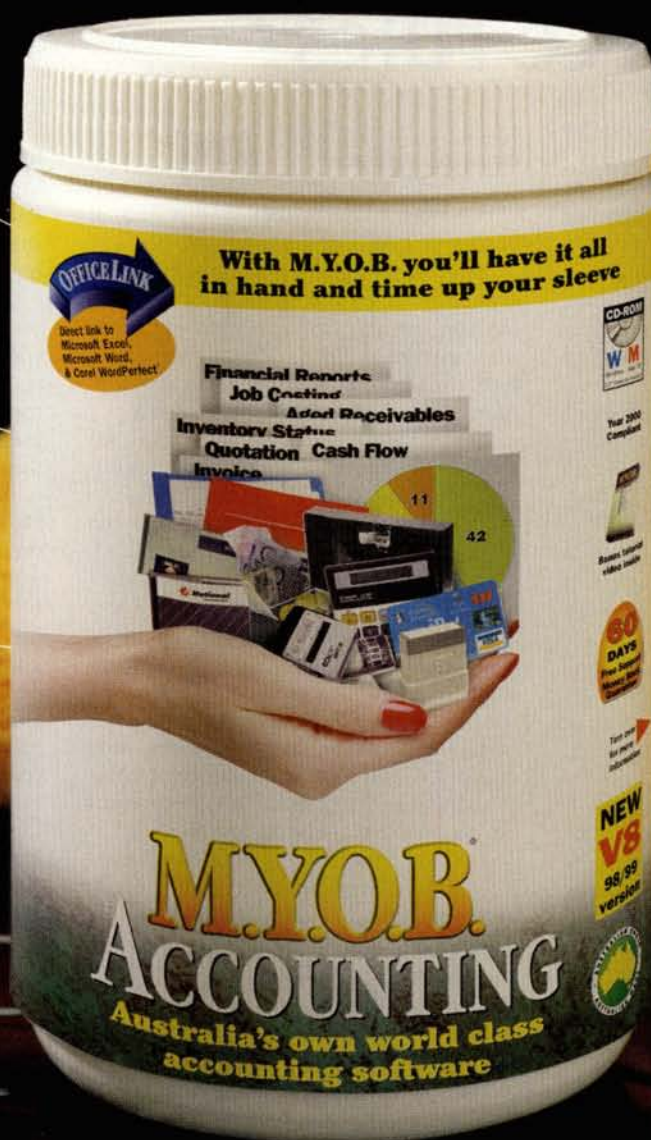
Selina Mitchell

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BOOM AND BUST

Empire sounds warning

Up to 1,000 customers have almost no hope of recovering monies paid to Empire Systems following the company's move into receivership, said Chris Palmer, administrator for chartered accountants O'Brien and Palmer. Thousands more customers have effectively lost the warranty provided with their systems.

Describing the company as "hopelessly insolvent", with assets of just \$87,000 and debts of some \$3.6 million, Palmer said, "The chance of unsecured creditors getting any money back is low." It is believed one creditor is owed over \$1 million and another \$580,000.

The NSW Department of Fair Trading has named Empire an "unfair trader" (see page 59).
Roulla Yiacoumi

SPAM CHAOS

Junk flows during spam clean-up ban

When Usenet anti-spam collectives began a moratorium on junk message cancellation on April 3, chaos was predicted for the Internet's discussion forums.

The moratorium's aim was to highlight Usenet's terrible signal-to-noise ratio, and encourage individual ISPs and originating networks to do something about newsgroup spam. Currently, most spam repair is done by volunteers

MS VERSUS THE WORLD

Foes contest Windows principles

While Microsoft fights a series of legal challenges over the validity of its marketing and licensing methods for Windows, it is facing an equally difficult battle in the court of public opinion.

This point was underlined in early April when a 10-point plan purporting to represent the opinions of Microsoft's competitors was delivered to the US Department of Justice (DOJ).

The plan called for the establishment of an industry supervisory board to oversee Microsoft's activities, in addition to the separation of the company's application and operating system divisions.

The anonymously authored document suggests an advisory board would be a more efficient mechanism for monitoring Microsoft's activities than prosecution, which it describes as unworkable and time-consuming.

Barely a fortnight later, Microsoft CEO Bill Gates outlined to developers attending the Windows World confer-

ence a set of four Windows Principles that underpin the ongoing development of the Windows operating system. Although not officially promoted as a response to the

Windows APIs in advance of other vendors.

The second principle concerns the maximisation of customer value by collaborating with hardware manufacturers to ensure the lowest possible prices. The third principle concerns the growth of third party solutions and services, markets Microsoft which has categorically stated it has no interest in entering at the moment.

The fourth principle sounds innocuous enough, simply stating that Microsoft strives to maximise customer value by making computers easier to use. This argument is, however, central to the question of whether or not Internet Explorer is part of the operating system. Microsoft claims IE is part of the OS rather than a separate product, a claim which has led to the ongoing legal battle with the DOJ.

Josh Gliddon



10-point plan, the principles touch on many of the same areas.

The first principle stated that Microsoft seeks to support third-party vendors by providing full disclosure and equal access to APIs. While this statement is correct, it does not address the legitimate concern that Microsoft has an unfair advantage in certain key software market segments because its application division has access to

ible through a broad sweep of newsgroups.

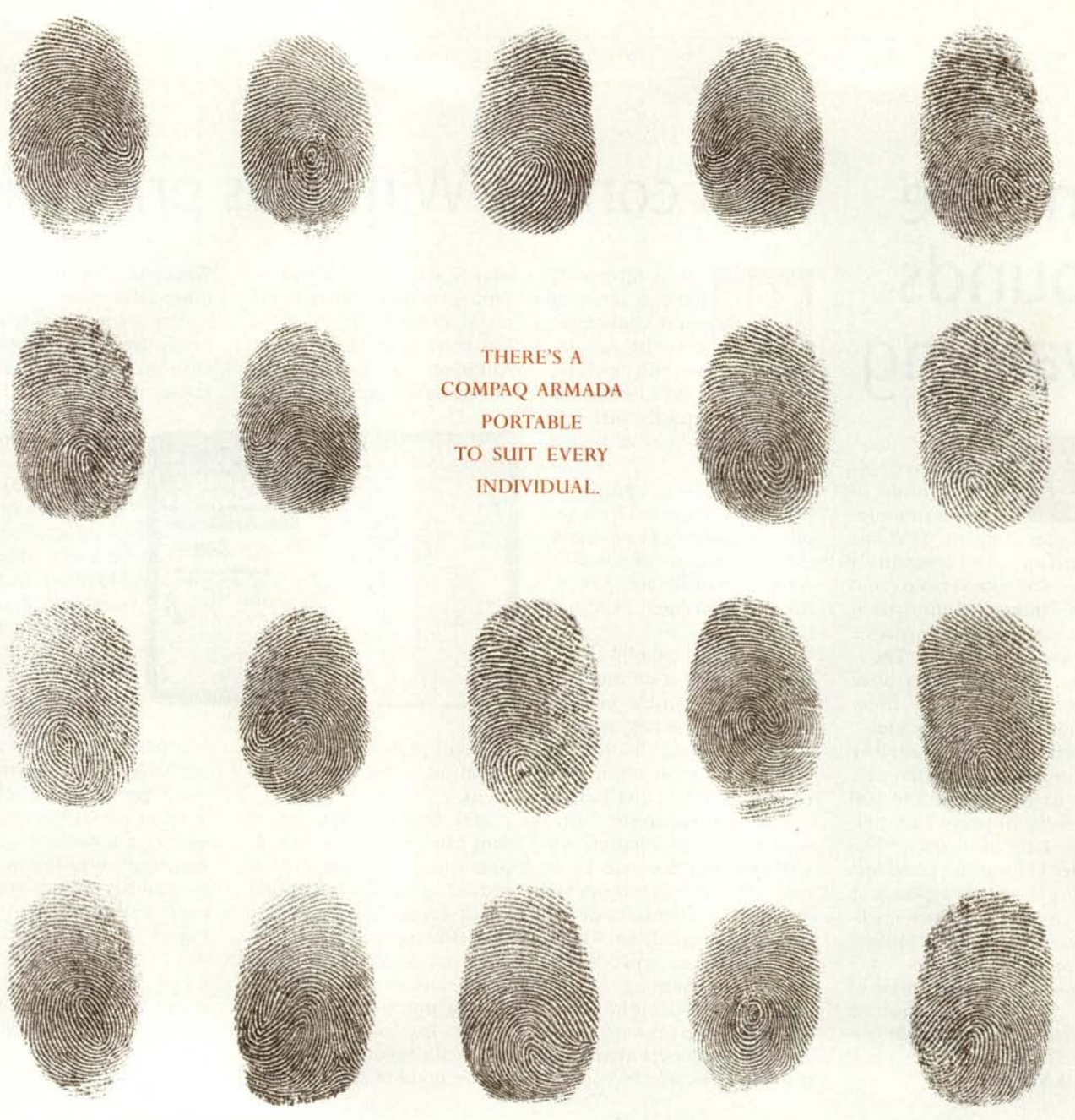
Sex-oriented forums with high readerships like alt.sex and the binaries.erotica variants are always favourite targets for spammers, and during the ban, these contained up to 95% junk. At the other end of the scale, the group alt.animals.foxes (for fans of the animal), rose to around 25% spam.

Cancellation collectives point out that users who dismiss the spam problem as insignifi-

cant to their personal Internet use are ignoring the cost to network providers of storage space and bandwidth for the vast quantities of junk postings spread across all newsgroups carried by a Usenet server. These costs are ultimately passed on to the end user.

Although the moratorium lasted just over two weeks, it was advertised as indefinite, to force organisations to look beyond short-term solutions.

Simon Vandore



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WHAT'S IN A NAME?

Gateway, Borland rebrand

Two veteran technology companies have changed their monikers, reflecting the importance of brand identity in an IT market where differentiation at the product level is becoming increasingly difficult.

PC firm Gateway has dropped the familiar '2000' from its name. With the new millennium looming, the term was becoming passé, said management, who also noted there were negative connotations surrounding 2000, related to the Millennium bug. Gateway, is also planning a partnering scheme to extend its current direct presence.

Hoping to shake off its sometimes troubled past, tools developer Borland is changing its name to Inprise, shifting its focus even further towards the enterprise object market. The name change is subject to stockholder approval at a meeting in early June.

Angus Kidman and
Selina Mitchell

VEXED BY VECTORS

Net vector standards battle looms

Rivals Adobe and Macromedia are about to face off in a new arena — defining a vector graphics standard for the Internet.

Macromedia plans to make its Flash file format available as "an open Internet standard for vector graphics and animation". Flash has become popular as a simple, albeit proprietary, means of adding animation to Web sites.

The plan is supported by a

LEGAL SWITCH

Copyright takes in technology

The Government has announced a new swathe of provisions to reform Australia's copyright protection laws in an attempt to cover all new technologies that emerge.

Until now, the Copyright Act has been difficult to interpret in regard to new technologies, as it is based on technology-specific transmission rights. (In the past the act was amended to cover photocopying, for example.)

Included in the reforms is a broad-based technology-neutral right of communication to the public. This will apply to Internet and online services, as well as the more traditional broadcasting and print transmission, and any new technologies, such as Web TV.

This right of communication will be subject to exceptions for fair dealing, libraries and educational institutions.

The draft Copyright Reform Amendment Bill, which will be available for public comment in the next few months, will also state that ISPs and carriers are not liable for infringements on their client's Web

sites just because it occurs via their facilities.

It will also include new enforcement measures for the Internet and new sanctions and remedies against the abuse of technological copyright measures, including program locks and encryption, said a joint press release from the Attorney-General and the Minister for Communications, the Information Economy and the Arts. It also proposes new

effectiveness of current protection mechanisms. For instance, streaming mechanisms, such as those used by RealNetworks, have been widely adopted by record companies and music sites (for example LiveConcerts, pictured) because they can't easily be copied by users. However, the British Phonographic Industry (BPI), the UK's peak music industry organisation, has expressed concerns that this

advantage is more apparent than real. A study commissioned by the BPI found that it was relatively easy to pirate RealAudio signals by diverting output from the PC's soundcard to a hard disk using specialised software and then copying that data to a CD.

On a more basic level, a PC's sound output can easily be captured on tape by a direct feed from its speaker system.

Selina Mitchell and
Angus Kidman



sanctions against the manipulation of rights management information attached to copyright material.

The move comes amid increasing concerns over the

Submission/1998/06.

Flash's widespread acceptance is likely to be to its advantage in the battle between the two standards. However, the fact that Adobe has taken a more conventional standards-driven path may help endear it to Net users. Macromedia has said it will submit Flash to a "recognised Internet standards body", but hasn't provided any details.

Angus Kidman

number of companies, including Brøderbund, IBM, Microsoft and RealNetworks. Details of the basic file format are at <http://www.flash.com/open>.

Meanwhile, Adobe, in partnership with IBM, Netscape and Sun, has submitted a standard known as Precision Graphics Markup Language (PGML) to the World Wide Web Consortium (W3C). PGML, which is expressed in the XML (Extensible Markup Language) standard app-

roved by the W3C earlier this year, is a more ambitious standard than Flash, designed to offer much of the functionality of PostScript to Web users, including control over printing.

Adobe is also targeting the standard at low-end graphics users, and is promoting the ability to produce much smaller files — an area Macromedia is also tapping into. Details of the PGML proposal are at <http://www.w3.org/>

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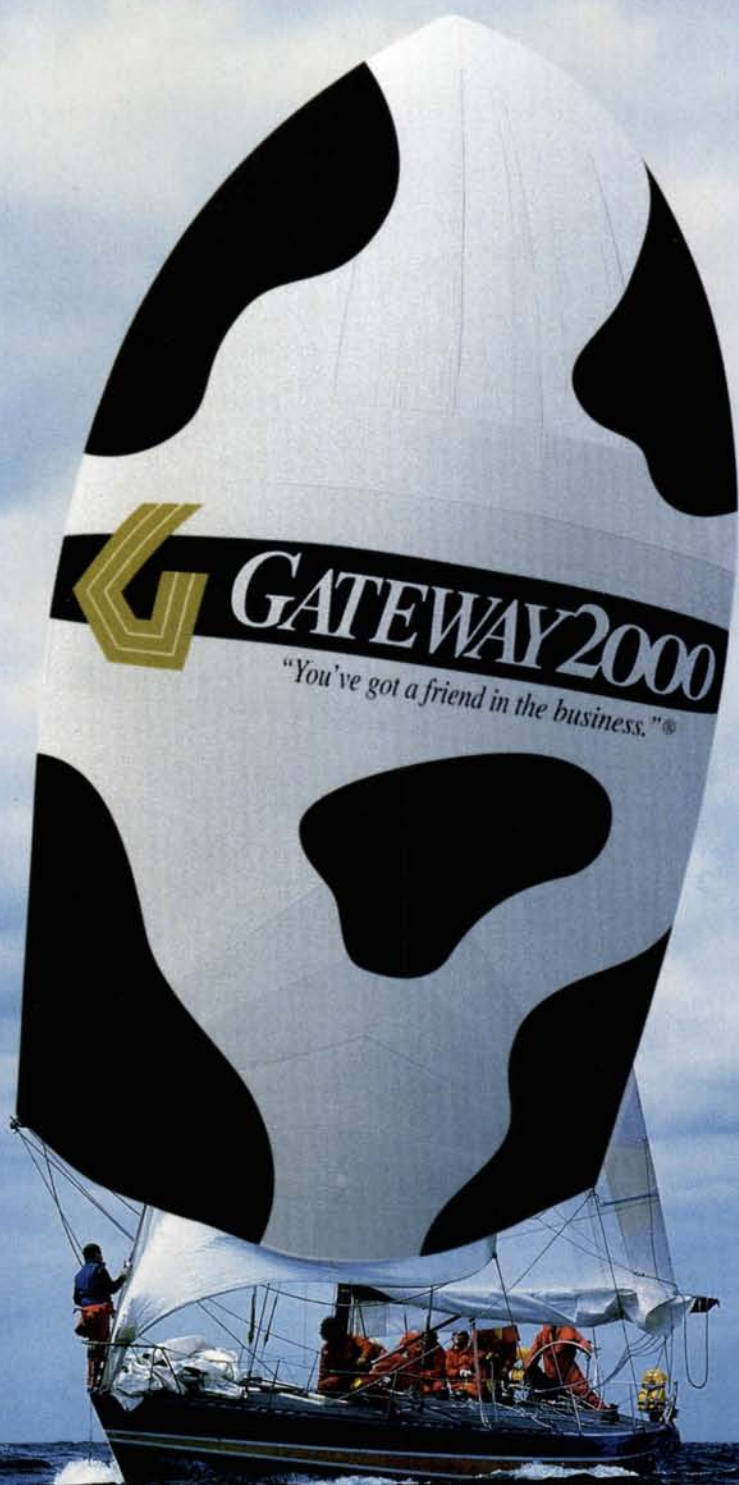
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ALR-7200

ALR-8200

ALR-9000

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Gateway GP computers are perfect for small and home offices, having been optimised to deliver power and flexibility. You get the horsepower you need now, together with the upgradeability that will keep you bobbing along well into the future.



Straight from the Crows Nest

The midnight watch has just spotted Microsoft Windows 98 - the **pentium® II** latest version of Microsoft's acclaimed operating system - on the horizon. When you buy a Gateway computer, you will now receive a free coupon that can be exchanged for Windows 98 just as soon as it comes ashore.¹ With Gateway 2000, you always get the advantage of tomorrow's technology today!

PC World, 1997 Readers' Awards
'Best Business PC' 'Best Home PC'

G6-233



¹ Available on all systems that include Microsoft Windows 95.
Customer responsible for redeeming coupon and for fulfillment charges.

Set Sail with a Gateway Portable

Gateway Solo Series

At Gateway 2000 we build our portables with the very latest technology. Which means that when you set sail with a Gateway portable your shipmates include such characters as 14.1" screens, SDRAM memory, DVD technology, up to 8GB of hard disk space and now, Intel Pentium® II processors.

First across the line with Pentium® II processor

The folk down in Gateway's engine rooms have always had a thing about bringing you the latest technology just as soon as it's available. With Intel's Pentium® II processor for portables, they've done it again.

The Pentium® II processor represents a dramatic breakthrough in notebook functionality. Speed and performance both benefit from this new architecture, optimised for 32-bit applications. Expect improvements of up to thirty

per cent over earlier Intel Pentium® processors with MMX™ technology at the same clock speeds, together with battery life that exceeds industry expectations.

Meet the Fleet

Gateway's range of portables now spans three very different race classes and harbours an endless number of configurations.

For those who need more of everything - especially speed, power and storage - our Solo 9100

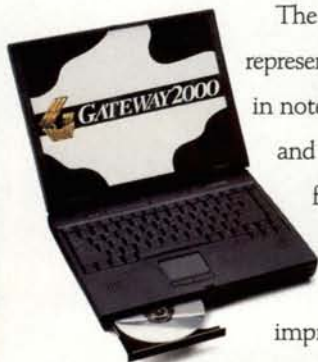
systems are true desktop replacements and now include DVD drives. Our Solo 5100 is one of the lightest models on the market, making it ideal if you spend a lot of time away from home port. Finally, we have the Solo 2300, a comprehensive fleet machine that combines value and portability.

Modular Design

Gateway portables use modular designs (including Intel's IMM modules) and share as many interchangeable components as possible (including hard drives, AC adaptors, memory and batteries).

You get unprecedented flexibility when you configure your notebook, together with the option of moving components from one portable to another - invaluable if you run a fleet of machines. Captain and crew alike can rest assured that these custom-built systems are readily re-rigged if an upgrade is ever needed. Of course, all Gateway portables have the option of Full or Mini Docking stations.

PC World,
1997 Readers' Awards
'Best Notebook'



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Sail along to our web site and check out all the latest activity at Gateway. We've developed an amazing web page called The Configurator that lets you "build" a system exactly as you'd like it and then generate a quote. Choose what you want, then place an order on-line - it's that easy.

Visit us today at: www.gw2k.com.au

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Corporate and Government customers are individually served by our dedicated Account Management team. Our consultants will visit you and discuss exactly how we can offer the best solution to your computing needs. Whether you're looking for an armada or a dingy, we'll make sure that you get exactly what you need.

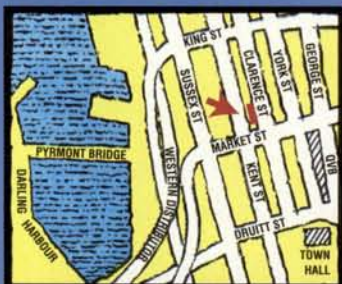
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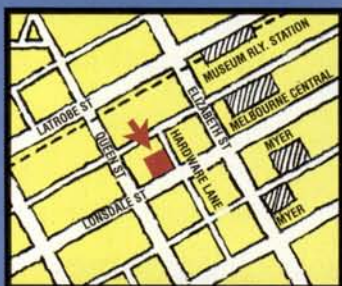


How to find us.

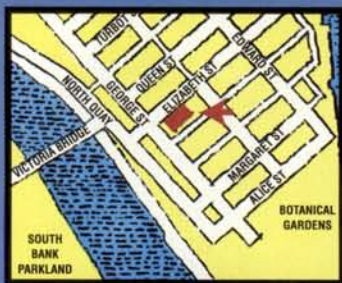
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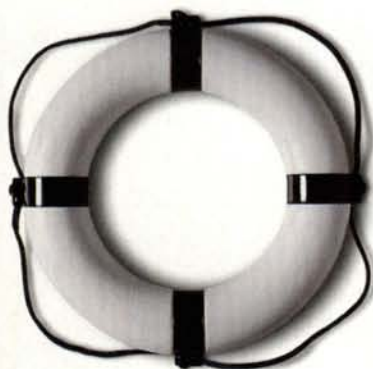
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The Perfect Crew

Rigged For You

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Gateway GP-Series Professional PCs

GP6-266	GP6-333	GP6-350	GP6-400
<ul style="list-style-type: none"> Intel 266MHz Pentium® II Processor 32Mb SDRAM Memory 512Kb L2 Integrated Cache 2.0Gb Ultra ATA Hard Drive 1.44Mb 3.5" Diskette Drive 4Mb nVidia AGP Graphics EV500 15" Monitor Min 13x/Max 32x CD-ROM Drive Midtower Case 104-Key Windows 95 Keyboard Microsoft Intellimouse McAfee VirusScan® MS Windows 95 + MS Windows 98 upgrade offer* MS Office 97, Small Business Edition+ 	<ul style="list-style-type: none"> Intel 333MHz Pentium® II Processor 32Mb SDRAM Memory 512Kb L2 Integrated Cache 4.0Gb Ultra ATA Hard Drive 1.44Mb 3.5" Diskette Drive 4Mb nVidia AGP Graphics EV500 15" Monitor Min 13x/Max 32x CD-ROM Drive Midtower Case 104-Key Windows 95 Keyboard Microsoft Intellimouse McAfee VirusScan® MS Windows 95 + MS Windows 98 upgrade offer* MS Office 97, Small Business Edition+ 	<ul style="list-style-type: none"> Intel 350MHz Pentium® II Processor 32Mb SDRAM Memory 512Kb L2 Integrated Cache 4.0Gb Ultra ATA Hard Drive 1.44Mb 3.5" Diskette Drive 4Mb nVidia AGP Graphics EV700 17" Monitor Min 13x/Max 32x CD-ROM Drive Midtower Case 104-Key Windows 95 Keyboard Microsoft Intellimouse McAfee VirusScan® MS Windows 95 + MS Windows 98 upgrade offer* MS Office 97, Small Business Edition+ 	<ul style="list-style-type: none"> Intel 400MHz Pentium® II Processor 64Mb SDRAM Memory 512Kb L2 Integrated Cache 6.4Gb Ultra ATA Hard Drive 1.44Mb 3.5" Diskette Drive AccelGraphics Permedia 2, 8Mb AGP Video Card EV700 17" Monitor Min 13x/Max 32x CD-ROM Drive Midtower Case 104-Key Windows 95 Keyboard Microsoft Intellimouse McAfee VirusScan® Windows NT WorkStation 4.0 MS Office 97, Small Business Edition+
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Gateway G-Series Multimedia PCs

G6-266	G6-333	G6-350	G6-400XL
<ul style="list-style-type: none"> Intel 266MHz Pentium® II Processor 32Mb SDRAM Memory 512Kb L2 Integrated Cache 2.0Gb Ultra ATA Hard Drive 1.44Mb 3.5" Diskette Drive 4Mb AGP Graphics EV500 15" Monitor Min 13x/Max 32x CD-ROM Drive Ensoniq PCI Audio GCS100 Speakers Desktop Case 104-Key Windows 95 Keyboard Microsoft Intellimouse x2 Technology 56 K/bits Data/Fax/Voice Modem and Speakerphone Telstra Big Pond Internet Kit with 50 hours free access* McAfee VirusScan® MS Windows 95 + MS Windows 98 upgrade offer* Microsoft Office 97, Small Business Edition+ 	<ul style="list-style-type: none"> Intel 333MHz Pentium® II Processor 32Mb SDRAM Memory 512Kb L2 Integrated Cache 4.0Gb Ultra ATA Hard Drive 1.44Mb 3.5" Diskette Drive 4Mb AGP Graphics EV700 17" Monitor DVD II ROM Drive Ensoniq PCI Audio GCS100 Speakers Midtower Case 104-Key Windows 95 Keyboard Microsoft Intellimouse x2 Technology 56 K/bits Data/Fax/Voice Modem and Speakerphone Telstra Big Pond Internet Kit with 50 hours free access* MS Windows 95 + MS Windows 98 upgrade offer* Microsoft Office 97, Small Business Edition+ 	<ul style="list-style-type: none"> Intel 350MHz Pentium® II Processor 64Mb SDRAM Memory 512Kb L2 Integrated Cache 6.4Gb Ultra ATA Hard Drive 1.44Mb 3.5" Diskette Drive 4Mb nVidia AGP Graphics EV700 17" Monitor DVD II ROM Drive Ensoniq PCI Audio Boston Acoustics Media Theatre Speakers Midtower Case 104-Key Windows 95 Keyboard Microsoft Intellimouse x2 Technology 56 K/bits Data/Fax/Voice Modem and Speakerphone Telstra Big Pond Internet Kit with 50 hours free access* MS Windows 95 + MS Windows 98 upgrade offer* Microsoft Office 97, Small Business Edition+ 	<ul style="list-style-type: none"> Intel 400MHz Pentium® II Processor 64Mb SDRAM Memory 512Kb L2 Integrated Cache 10Gb Ultra ATA Hard Drive 1.44Mb 3.5" Diskette Drive 4Mb nVidia AGP Graphics EV900 19" Monitor DVD II ROM Drive Ensoniq PCI Audio Boston Acoustics Media Theatre Speakers Tower Case 104-Key Windows 95 Keyboard Microsoft Intellimouse Zip Drive and 100Mb Zip Disk x2 Technology 56 K/bits Data/Fax/Voice Modem and Speakerphone Telstra Big Pond Internet Kit with 50 hours free access* McAfee VirusScan® MS Windows 95 + MS Windows 98 upgrade offer* Microsoft Office 97, Small Business Edition+
\$2599 inc. tax or \$23 p/w*	\$3599 inc. tax or \$31 p/w*	\$4499 inc. tax or \$39 p/w*	\$5799 inc. tax or \$49 p/w*

Gateway Solo Portable PCs

2300SE	5100LS	9100SE	9100XL
<ul style="list-style-type: none"> Intel 166MHz Pentium® Processor with MMX® Technology 12.1" DSTN Passive Matrix Colour Display 16Mb SDRAM (expandable to 192Mb) 256Kb Pipelined Burst Cache 128 Bit 2Mb Neomagic Video Accelerator 2Gb Ultra ATA Hard Drive Modular 1.44Mb 3.5" Diskette Drive Integrated Yamaha 16-Bit Sound with Stereo Speakers NiMH Battery & AC Pack EZ Pad Pointing Device Parallel, Serial, Fast Infrared, PS/2, ext. Video & USB ports Casual Carry Case MS Windows 95 + MS Windows 98 upgrade offer* 	<ul style="list-style-type: none"> Intel 233MHz Pentium® II Processor 14.1" XGA Active Matrix Colour Display 64Mb SDRAM (expandable to 144Mb) 512Kb Pipelined Burst Cache 2Mb EDO VRAM 3Gb Ultra ATA Hard Drive Modular 1.44Mb 3.5" Diskette Drive Modular 8/20 Speed CD-ROM Drive Integrated 16-Bit SoundBlaster PRO compatible Sound with Stereo Speakers 56K/Bits Modem & 50 hrs free Internet access 9 Cell Lithium-Ion Battery & AC Pack EZ Pad Plus® Scrolling Pointing Device USB Ports, CardBus, Fast Infrared NTSC/PAL Video Output Casual Carry Case McAfee VirusScan® MS Windows 95 + MS Windows 98 upgrade offer* Microsoft Office 97, Small Business Edition+ 	<ul style="list-style-type: none"> Intel 266MHz Pentium Processor with MMX® Technology 14.1" XGA Active Matrix Colour Display 32Mb SDRAM (expandable to 192Mb) 512Kb SRAM Write-Back Cache 64bit 4Mb SGRAM 2D/3D Graphics Accelerator 3Gb Ultra ATA Hard Drive Modular Combo Min 8X/Max 20X CD-ROM Drive & 1.44Mb 3.5" Diskette Drive Integrated Yamaha 16-Bit Sound with Stereo Speakers 12 Cell Lithium-Ion Battery & AC Pack EZ Pad Plus® Pointing Device USB Ports, CardBus, Fast Infrared NTSC/PAL Video Input & Output Casual Carry Case McAfee VirusScan® MS Windows 95 + MS Windows 98 upgrade offer* Microsoft Office 97, Small Business Edition+ 	<ul style="list-style-type: none"> Intel 266MHz Pentium® II Processor 14.1" XGA Active Matrix Colour Display 64Mb SDRAM (expandable to 192Mb) 512Kb SRAM Write-Back Cache 64bit 4Mb SGRAM 2D/3D Graphics Accelerator 8Gb Ultra ATA Hard Drive Modular Combo DVD Drive and 1.44Mb 3.5" Diskette Drive Integrated Yamaha 16-Bit Sound with Stereo Speakers 56K/bits Modem & 50 hrs free Internet access 12 Cell Lithium-Ion Battery & AC Pack EZ Pad Plus® Pointing Device USB Ports, CardBus, Fast Infrared NTSC/PAL Video Input & Output Executive Carry Case McAfee VirusScan® MS Windows 95 + MS Windows 98 upgrade offer* Microsoft Office 97, Small Business Edition+
\$2999 inc. tax or \$26 p/w*	\$5599 inc. tax or \$47 p/w*	\$5599 inc. tax or \$47 p/w*	\$8499 inc. tax or \$71 p/w*

2300LS Intel 233MHz Pentium® Processor with MMX® Technology, 12.1" Active Display, 32Mb SDRAM, 2Gb Hard Drive, 8/20 CD-ROM, 12 Cell Lithium-Ion Battery, McAfee VirusScan®, MS Office 97, SBE+ \$4299 inc. tax or \$37 p/w*

2300XL Intel 233MHz Pentium® Processor with MMX® Technology, 13.3" XGA Active Display, 32Mb SDRAM, 512Kb Cache, 3Gb Hard Drive, 8/20 CD-ROM, 56K/Bits Modem & 50 hours free Internet access, 12 Cell Lithium-Ion Battery, McAfee VirusScan®, MS Office 97, SBE+ \$5299 inc. tax or \$45 p/w*

Solo 5100 Intel 233MHz Pentium® Processor with MMX® Technology, 32Mb SDRAM, 2Gb Hard Drive, no Modem \$4699 inc. tax or \$41 p/w*

Solo 9100LS - Intel 233MHz Pentium® II processor, Combo 8/20 CD-ROM & 1.44Mb Diskette Drive, 4Gb Hard Drive, Casual Carry Case. \$6599 inc. tax or \$55 p/w*

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Now on x86, Be is a powerful operating system targeted at the multimedia specialist.

BeOS

Jean Louis Gassée, founder and CEO of Be and ex-Apple heavyweight, has dubbed it "software siltation". It is the process by which the technical progress of operating system development slows due to the baggage of backward compatibility. As siltation increases, the degree to which an OS can take advantage of the underlying hardware's capabilities diminishes. Windows 95, ostensibly the most popular 'modern' operating system on Earth, is a case in point, as it still doesn't support true multithreading and multitasking. Still, it's a whole lot better than what went before it.

BeOS is not intended to be a rival for mass-market operating systems. Back in 1996, Gassée said, "This [OS] won't be suitable for consumption by normal humans for a couple of years yet." Instead, Be is aiming at the niche occupied by the late, lamented Amiga — a machine still enormously popular in the video and film post-production world. Be is intended to be used by content creators, people who build multimedia or even conventional media such as TV and sound. It incorporates MIDI, 3D and OpenGL, as well as the ability to handle and process digital sound.

The original BeOS was PowerPC only; you could buy a dual-processor BeBox from Be to run it on, or use your existing Power Macintosh or Power Mac clone. Because of Apple's much tighter hardware/software relationship, BeOS lingered on the PowerPC platform, and at one stage was even mooted as a replacement for the Mac OS itself, until Steve Jobs came along and sold NeXT to Apple instead.

Considering the disparity of hardware configurations in the Intel world, porting to the x86 platform can't have been easy for Be. This is illustrated by the very strict hardware guidelines accompanying R3 — only IDE hard drives are supported, and the only compatible soundcard is Creative's AWE64. There is no SCSI support. We found that when trying to use an AWE64 Gold, even seemingly negligible changes in specification affected the component's compatibility with the OS.

We initially had difficulty setting up BeOS on our Digital Venturis test machine. The installation application built a partition for the OS with no problems, as it can hap-

pily coexist with an existing setup, but it was unable to locate a boot volume to complete the process. This problem was routed by the construction of a custom test machine with a Pentium 100 processor, 32M of RAM and a 1.6G hard drive as its basis. Although the hardware conflict that prevented the Digital from booting was never identified, the test machine, with ostensibly the same components, gave no such problem.

We were unable to test BeOS to its full extent because of our test machine's mar-



ginal processing power and a dearth of multimedia applications. Demonstrations on more powerful systems, however, have shown that up to 12 windows of full-motion video can run simultaneously. Any processor in the P200 class and above (Pentium Pro and PII are also supported) would be more than adequate for these applications.

BeOS's user interface is clean and simple, consisting of a Deskbar that tracks which applications are open and where, over the nine allowable workspaces. Be's multithread capabilities allow each workspace to have its own task, and even its own look and feel, operating simultaneously. Switching between them is easy; just hit Alt-F1 for workspace one, Alt-F2 for workspace two, and so on.

TCP/IP is embedded deep in the heart of the system, making setting up a Net connection a snap. Email is considered a central system application, and is accessible from the Deskbar, while the browser that R3 ships with appears to be an adaptation of Mosaic.

System functionality can be extended with kernel add-ons; unlike Macintosh extensions, these kernel extensions don't appear to consume additional memory or system resources.

Many of the precepts used in BeOS will be familiar to Windows 95 or Mac OS users, with warm-looking icons, a garbage can, and softlinks ability, or pointers on the desktop. Windows users call them shortcuts, Mac OS users aliases; however, the Be version is a little more tricky to use than the simple right-click used in Windows, needing to first be created and then dragged onto the desktop.

In other ways, Be can be quite like Unix, right down to its use of the BASH for command line interface, the X Window-like multiple workspaces and the compact, extensible kernel. It would be easy to think of Be as a user-friendlier version of Unix, although to do so would be to sell short Be's achievement in developing this operating system.

Of greater interest is the OS's ability to replicate software objects to enable other applications to take advantage of their code and functionality. Like Microsoft's Active Desktop, the Be workspace can be used as a container for software objects, although the functionality of the object extends further under Be than under Microsoft's cursory implementation.

Be is one of the few entirely new operating systems available on the open market. It's certainly not for everyone, and potential users should check their hardware specifications very carefully before purchasing it. But for multimedia developers, or the technically astute, Be is well worth a look.

Josh Gliddon

BeOS

■ Distributor	Be
■ Phone	Web site or postal distribution only
■ Online	http://www.be.com
■ Price	\$US99.95
■ In short	Limited by a lack of applications, the underlying power of BeOS means that someone is going to develop the killer multimedia application soon. All OSes should be this powerful and stable.

Of all the ways the BJC-7000 revolutionises printing, the most dramatic is the P-POP difference.

"Absolutely breathtaking" photographic printing. "Capabilities never before seen..." Then there is the big difference! P-POP.

"CANON PUSHES STATE OF THE ART..."¹

P-POP is Plain Paper Optimised Printing. As the "printer industry bible" (Hard Copy Observer) says, it "...pushes state of the art..."¹ to completely change plain paper print quality.

An all new approach. P-POP bonds an invisible ink optimiser to the paper before inks are applied. The inks, in turn, bond to the optimiser.

This dramatically reduces ink diffusion. Text and lines are better defined, colours are more vibrant and tones are sharper because the inks are not mixed in an unwanted way.

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Colours and blacks are far less likely to fade. And print-outs become water fast.



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The other system is second generation PhotoRealism. As Hard Copy Observer says, "... (it) is absolutely breathtaking..."¹



The first "7-colour process". The secret is the PhotoRealism colour ink cartridge, included as standard. It uses a seven-ink process, conventional CMY, new lower density CMY inks, plus black. Also, thanks to P-POP it is the first low-density ink system that can be used on plain paper.



1. U.S. Hard Copy Observer, August 1997. 2. Optional BC-61 CMY ink cartridge. 3. Speed is an estimate and, for comparability, is based on a competitive manufacturer's colour retail price, including tax. Canon Australia Pty Ltd ACN 005 002 951. Canon and the Canon logo are registered trademarks and PhotoRealism and P-POP are trademarks

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A new gold standard.
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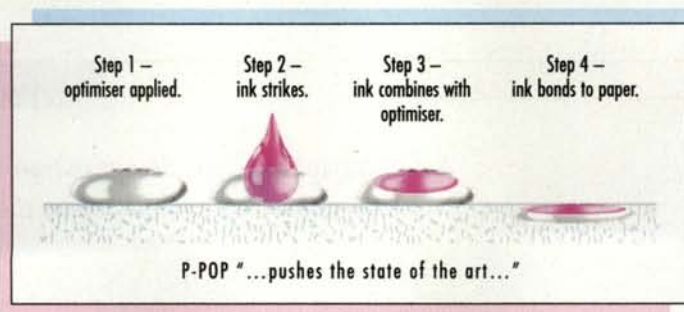
9000% more colour! The inks can be combined and layered, producing up to nine saturation levels per colour, per pixel. This results in up to 90 times the colour combinations of traditional CMYK inks, and considerably better "process blacks and darks".

Almost invisible pixels. This, combined with the Canon Colour Image Processing System (CCIPS), completely changes the way both dark and light half-tones are reproduced. Colours have far finer gradations without banding and lines. And even on hard-to-produce light shades such as skin tones and off-whites "...individual pixels in the image are barely visible".¹

"(CARTRIDGE) CAPABILITIES NEVER BEFORE SEEN..."¹

Then, the cartridges "...are the largest we have seen ...(offering) new capabilities never before seen in a desktop inkjet printer ...(with more ink nozzles) than any other cartridge in the industry".¹

50% smaller nozzles. The nozzles are approximately half the diameter of previous models, so



drops per second, using up to 1088 ink nozzles.

Blacks 80% faster. There are 304 nozzles for black alone. This generates speeds up to 720 characters per second with bi-directional printing, and up to four text lines per head pass. Putting this in perspective, this is 80% more than the rated CPS speed of the Epson 800!



480 colour nozzles. There are 480 nozzles dedicated to colour in the PhotoRealism cartridge. (This is 150% more nozzles than the Epson 800.)

The BJC-7000 achieves colour speeds as high as 4 ppm.³ And, thanks to PhotoRealism, true photographic quality can often be delivered at speeds far faster than printers using only conventional inks at high dpi.

Lower costs, better paper handling. Better plain paper use can obviously lower operating costs. There is also new, full-bleed A4 printing and the ability to print full card stock at paper weights up to 550 g/m2 (0.8mm).

Canon Customer Care. Finally, the BJC-7000 features a one-year warranty, upgradeable to three years for minimal cost, and is backed by our Customer Care hot-line support. Drivers are available for DOS and Windows 3.1x/95.

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Second generation PhotoRealism produces 9000% more colour combinations for "absolutely breathtaking" results.

text test. Actual speed will vary based on system and other factors. Canon estimates maximum colour graphic performance at 3.5ppm. Price as shown is recommended of Canon Inc. All other trademarks are the property of their respective owners.

A flagship for the Open Source movement, Gimp is an image editor with a feature set comparable to that of Photoshop, but it's free.

Gimp

A simple acronym is no longer enough; to qualify as a real hacker, you now need to use nested acronyms: ones in which the letters don't stand for words, but for other acronyms. Take Gimp for example; 'Gimp' is an acronym for 'GNU Image Manipulation Program', and 'GNU' stands for 'GNU's Not Unix', so in fact 'GNU' doesn't really stand for anything.

So much for the name, what about the program? Well, the image manipulation program Gimp is an alternative to commercial software, such as Adobe Photoshop. But, in the great tradition of Unix hackerdom (which has created a culture of largely free, cooperative software development — most noticeably Linux), Gimp is not the product of some high-powered corporation. It's a piece of remarkable freeware, written by Peter Mattis and Spencer Kimball, aided and abetted by a large number of online developers. There are currently no Windows or Mac ports, but there is an OS/2 version under development.

It is a surprisingly powerful piece of software which can do most of the things its expensive commercial rivals can do — and quite a few they can't. You can use it as a straightforward paint program, or as a high-powered photo-retouching program. It can also be used to batch process whole sequences of images, which makes it ideal for converting stacks of scans into Web-ready images.

The developer version of Gimp APC Labs tested was 0.99.26, but new versions are available every few days and there should be a final, stable Version 1.00 available for download by the time you read this.

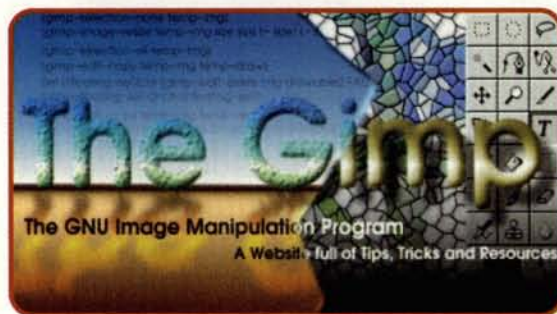
At first glance, Gimp has a very austere look; all you see is one tiny toolbox (so narrow that on our test system we couldn't even read the program's name), but appearances can be deceptive.

For a start, it includes all the standard image-editing and painting tools: a text tool; assorted brushes (including custom ones); pencil and airbrush tools; and a clone (or rubberstamp) tool. All the paint tools have an anti-aliasing option, which creates the effect of smoother curves and blends. There is a full set of manipulation and transformation tools (including rotate, scale, shear and flip) and the regulation

assortment of selection tools (including rectangle, ellipse, free-form, magic wand and Bézier).

As well as the basic tools, the program includes full alpha channel support and extensive layer options, which allow images to be montaged, simplifying the organisation of complex images. As well as moving, hiding, renaming and deleting layers, you can specify custom transparency for each one and determine how images on different layers interact (using effects such as darken, dissolve, overlay and so on).

Gimp includes impressive gradient editor and blend tools which allow custom



options to be stored and reused. Gradients are applied interactively by clicking and dragging, but can be edited precisely. They can also be made partially transparent, allowing subtle transitions and effects to be created.

The finished program will be able to import and export numerous image file formats (such as GIF, JPEG, PNG, TIFF, PCX and BMP), but not all of these were working in the version we tested. Eventually Gimp will be able to convert an extensive array of formats, which will make it an ideal tool for batch processing large numbers of files.

The extensive set of built-in tools are just the start of Gimp's power. It has been designed so that any user with sufficient expertise can expand it with plug-ins and extensions. Gimp's Web site has a registry of plug-ins which have mostly been developed by Gimp enthusiasts to solve their own image-editing problems. There are plug-ins for just about any image manipulation task you can imagine (and quite a few for tasks you've probably never imagined). If there isn't an existing plug-in and you lack the skills to develop one yourself, don't despair;

Gimp includes a scripting interface — a kind of super macro language — that allows the automation of everything from the simplest to the most complex task.

We tested Gimp using a 486 with 16M of RAM, running RedHat Linux Version 5. This would be an inadequate platform for most image editors (the Unix version of Photoshop, for example, requires a minimum of 32M of RAM to run), and while Gimp's performance wasn't breathtaking in our tests, it was perfectly usable — on a more powerful PC it would fly along. It achieves this remarkable performance partly by using a form of virtual memory which means that image size is limited only by available disk space. The way the program utilises memory also means that you can have a virtually unlimited number of images open at one time.

Given its power and price tag (it's free, as are the plug-ins), Gimp might look too good to be true, and there is a catch: there's no online help and the full manual could take several hours to download and print out. If you're the kind of person who needs to call tech support every time your mouse needs cleaning, this is not the program for you. However, if you can cope with the technicalities of running Unix in the first place (and especially if you've mastered Linux's DIY intricacies), then Gimp is a wonderful program, which will provide you with hours of fun while you investigate its potentially unlimited power.

Jim Endersby

Gimp

■ Distributor	None (download only, may appear in some Linux distributions)
■ Phone	N/A
■ Online	http://www.gimp.org
■ Price	Free
■ In short	An amazing program, as long as you have the technical ability to download, compile and install it.

New Super Economy mode lowers costs in colour and B&W to print page after page after...

For just \$199 RRP, the new BJC®-210SP delivers both Photo Mode quality colour, and black & white at a speed comparable to a personal laser. It also helps lower operating costs in two ways.

Use 75% less ink. A new Super Economy mode has been developed.

It reduces ink consumption by 75% compared to Standard mode, and works in both black and white and colour printing.

Bigger black cartridge. In addition, there's the new high capacity black ink cartridge that holds 20% more ink than our previous cartridge, yet costs no more.

Up to 5 times the output. Combine these two features and the new BJC-210SP can print up to 2400 pages in black and white, and up to 600 in colour.

That's anywhere from two to five times the output of any direct competitor!

Photo Mode quality printing. Using the colour cartridge, included as standard, the BJC-210SP offers a choice of three high quality print modes – Normal, Fine and Photo.

Advanced half-tones. Photo Mode uses the Canon Colour Image Processing System (CCIPS) to emphasise highlights, contrasts and shadows and visibly improve half-tones by producing a richer process black.

Up to 24% faster. The BJC-210SP also includes a black cartridge as standard. It has up to twice as many print nozzles as direct competitors, is up to 24% faster¹ and delivers resolution up to 720 dpi. Speed and quality are equally impressive in colour.

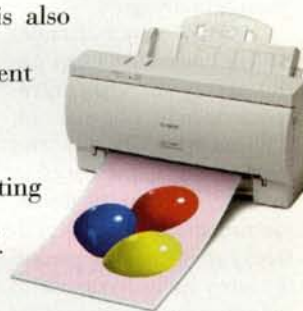
Canon Customer Care. All Canon printers feature a one-year warranty, upgradeable to three years for minimal cost, and are backed by hot-line support from our Customer Care staff.

There is also

an optional fluorescent

ink cartridge for high impact.

For more information on cutting printing costs call 1800 021 167.



1. B&W speeds based on manufacturer's actual characters per second ratings. Price as shown is the recommended retail price, including tax. Canon Australia Pty Ltd ACN 005 002 951. Canon, the Canon logo and BJC are registered trademarks of Canon Inc. All other trademarks are the property of their respective owners. CS/4895

Now only \$199 RRP

Canon

The Gadget File

This month sees the first segment of The Gadget File, a new section dealing with new technology. Not high-end computing technologies, but what could more accurately be described as the gadget end of the spectrum.

● One development which promises huge steps forward in the way we run our lives is the cash-loadable smart card. Telstra has been running limited trials of its Phonecard-based smart cards at several universities, allowing students to keep identification, library passes and other details on the new cards instead of having a wallet full of ID cards and bar-coded authorisation tickets. Smart cards were first used as a commercial ticketing system at this year's Royal Easter Show in Sydney. As well as using cash or credit cards, visitors could opt to use pre-purchased \$20 smart cards to pay for entry into the show and also for some of the rides. The cards were simply swiped to deduct the required amount of credit. The Telstra Smart Phonecards use contact strips to exchange information and update the status of the

card, and need to be inserted into a reader to perform the transaction. It seems likely that Telstra will extend their use next year, and possibly offer reloadable smart cards, so they don't have to be thrown away as soon as all the credit has been used.

● Timekeeper Swatch is touting an alternative to smart cards in its watch-based ecredit system, Access. Swatch has signed a deal with 2000 Olympic organisers to make its Glorious Runner timepiece an official credit provider for the games. Glorious Runner wearers can prepay for a tiny slot-in chip which sits behind the watch display and stores credits. Unlike the Telstra cards, the credit status is read by a special contactless reader. It uses a tiny loop antenna in the watch and a static energiser/down-load module at each entry or till station. This type of cashless transaction is already in extensive use on European ski fields, where fumbling for a lift pass or loose change with frozen fingers has been replaced by a casual wave of the gloved wrist. Both Swatch and Telstra have plans to extend their cardcash ID technology to

public transport systems and restaurants, and for security at specific events.

● The other significant arrival on the tiny but useful front is the PC Card phone. Both Nokia and Ericsson have released versions of this development of the GSM digital phone. Each company has taken one of its GSM mobiles and stripped off its display, keypad and battery, leaving just the bare electronic bones. The remaining circuits have been squeezed into a Type II PC Card form factor. The user simply slips in a GSM SIM (subscriber identity module) card, slides the whole thing into a spare notebook slot, and loads the driver software. The host PC then acts as the power supply, screen and input/output stage for the phone. The result is a totally integrated data and voice communications station in a notebook, without wires, models, lap-juggling and battery scares. Costs were not available at the time of print, but they are expected to be around \$600 to \$700 — less than a comparable complete phone.

Jeremy Torr

3Com Palm III

Given the success of the original, the designers at 3Com would have had their fair share of sleepless nights putting together a Palm III spec for the PalmPilot upgrade. And although the Palm III isn't a major leap forward, on the whole the result is pretty good.

The two major changes on the technical front are the ability to beam infra-red data to any other Palm III nearby, and the improved file-link capability which allows the downloading of non-Pilot files at HotSync. Other upgraded features include an extra megabyte of memory (2M total), a slightly more pocketable shape, a lid and a new stylus. There is also a small redesign of the hotkey buttons and a new connector strip which is covered by a neat spring-loaded cover. The latter means that the new Palm III works in old HotSync cradles, but

old PalmPilots won't work in the new, more rounded cradles.

Thankfully, the designers have left the screen and input zones alone, simply upgrading to more readable fonts. This means existing users won't be fazed by an entire new methodology — a vote of confidence in the original's sound design.

The new stylus is a much heavier and more usable metal item with screw-in plastic ends, one of which can also be used as a reset pin. The lid, however, is a bit of a dud. It does the job of protecting the screen, but looks like a design afterthought. Luckily it clips off easily and the Palm III fits straight into the old Pilot pouch.

Infra-red beaming is very neat. Any entry or category can be tagged for beaming and, when another unit comes within range (about 1m), you simply press and hold the Address hotkey and the

data will be sent as long as the receiver accepts it. The process is quite fast, even for lengthy lists or memos, but is proprietary, so it can't print to standard IrDA printers.

On the host PC, the Palm Desktop application is virtually identical to the Pilot Desktop, with the addition of a more simple Install Program function and the new File Linking option. The latter allows any CSV or ASCII file to be linked to the Pilot so updates can be transferred, even though they are not part of the central application suite.

Overall, a soundly executed iteration of an already successful product.

Jeremy Torr



3Com Palm III

■ Distributor	3Com
■ Phone	(03) 9934 8885
■ Online	http://www.3com.com
■ Price	\$799
■ In short	A well-thought-out upgrade. All the existing pluses and more without any let-downs, apart from a silly lid.

Brilliant colour, PhotoRealism and an extra large print head for faster blacks.

When it comes to versatility, the BJC®-4200 is ahead of its class.

Four printing systems. It accepts a choice of four different cartridge-based printing systems, designed to tailor your output to your printing needs. Two are included in the box as standard.

Photo quality CMYK. The first standard system is four-colour process printing, with driver settings for Economy, Text and Photo. The Canon Colour Image Processing System (CCIPS), and resolution up to 720 dpi, gives you outstanding half-tones by combining pure and process blacks.

Blacks at twice the speed. The other standard system, specifically for black & white correspondence, is an unusual feature.

It is a dedicated, extra large black ink cartridge with 128 print nozzles capable of printing two text lines at speeds up to 510 characters per second.

Don't be confused. Many manufacturers make all sorts of claims about pages per minute. But, in reality, using their own characters per second ratings, you'll find that the BJC-4200 can be more than twice as fast! (Also see output chart.)



Canon's exclusive PhotoRealism.

Third, there is Canon's unique PhotoRealism.

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This option is more than just a claim, it is fast becoming the photo quality printing gold standard.

500% more colour combinations. Special low-density inks can vary the amount of saturation per pixel so that a single dot could have 0%, 33%, 67% or 100%.

This produces up to five times as many colour combinations as conventional CMYK inks.

Virtually no pixelisation. The result is better half-tones and more subtle colour gradations, with almost no visible grain and dots, even in areas of low colour density.

Canon Customer Care. All Canon printers feature a one-year warranty, upgradeable to three years for minimal cost, and are backed by Customer Care hot-line

support. Finally, our fourth ink system, Fluorescent ink, is also an option, and drivers are available for DOS, Windows 3.1x/95 and Windows NT.

If you would like to learn more about tailoring the highly versatile BJC-4200 to your printing needs call us on 1 800 021 167.



Now only \$299 RRP

Canon

Microsoft Visual J++ 6.0

The recently launched Version 6.0 of Microsoft's Visual J++ brings it up-to-date with other components in the Visual Studio suite.

Like the other tools in the suite, Visual J++ is excellent for building Windows applications, but is much less useful for developing cross-platform applications — a deliberate decision on Microsoft's part.

As far as the Integrated Development Environment (IDE) goes, it's exactly what you would expect from a component of the Visual Studio suite. The interface is easy to use, and it provides many of the

powerful features found in Visual Basic and Visual C++. Java applications can be produced efficiently and easily.

Visual J++ 6.0 is Microsoft's first finished product to use the Windows Foundation Classes (WFCs). The WFC components operate only on the Windows platform, as opposed to Sun's Java Foundation Classes and Swing components. Furthermore, the WFCs are not compatible with the widely-adopted JavaBeans standard, so they will only run under IE4.

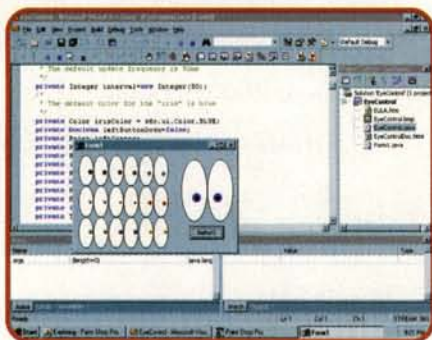
Visual J++ also relies heavily on Microsoft's proprietary JDirect technology for making native Windows API calls. JDirect is heavily tied in with the WFCs, and is used almost exclusively over the JDK's JNI (Java Native Interface) standard within the product.

The JDirect framework also reintroduces a nasty concept to Java developers: pointers. While pointers are powerful programming tools, they are one of the greatest sources of bugs in programs, and were intentionally omitted from the Java language specification. However, many of the methods in the Windows API require

pointer values to be sent as arguments, so their inclusion is necessary to call Windows methods. Microsoft has also extended the core Java language, adding new keywords to J++ 6.0, including 'delegate', 'multicast', 'conditional compilation' and 'conditional method'.

While it's true that Windows-only features can be turned off to produce 'pure Java', developers who wish to deploy applications on multiple platforms will still be better off using another development tool, such as Borland JBuilder 2 (see below).

Travis Simon



Microsoft Visual J++ 6.0

■ Distributor	Microsoft
■ Phone	(02) 9870 2200
■ Online	http://www.microsoft.com.au
■ Price	Not yet available
■ In short	Visual J++ 6.0 is the most disappointing Java IDE release to date.

Borland JBuilder 2

The Java language is still relatively young and immature, and until now so were the tools for creating Java applications. Almost all the first-generation IDEs excelled in one area of Java development, but were lacking in others. With the second release of JBuilder, however, Inprise provides a powerful Java IDE, complete all the features needed to build powerful applications — fast.

One of the most notable aspects of Java development (to developers anyway) is the fast rate at which APIs and JDKs (Java Development Kits) are updated. Inprise has recognised this trend, as well as the need to write for superseded versions of JDKs to ensure compatibility. JBuilder makes it easy for the developer to switch JDKs, ensuring support for any Java version required.

JBuilder looks and functions much like Inprise's other RAD (Rapid Application Development) environments. The screens are laid out in a clear manner, using tabbed panes to separate information into logical groups. Component-based programming is also emphasised, and JBuilder includes over

200 JavaBeans (source code included with the Professional and Client/Server editions) with the IDE.

An important aspect of a development tool is its adherence to the language specification. For Java, this is even more important since there are multiple virtual machines on different operating systems. Tests run on JBuilder using the JVS Validation Suite reveal that JBuilder's support for Version 1.1 of the Java standard is exemplary. Developers wishing to use advanced JDK 1.1 concepts, like Remote Method Invocation (RMI) and serialisation, will have no problems writing or deploying applications.

Evidenced by its recent acquisition of Visigenic Software (creator of VisiBroker CORBA object request broker), Release 2 of JBuilder also reflects Inprise's focus on enterprise development. In addition to VisiBroker 3.2, the Client/Server edition will incorporate the Express Development Server to deploy applications across the Inet. JBuilder includes wizards for using RMI, Visual SQL query editors, and visual tools for creating Enterprise JavaBeans.

The remaining 'standard' IDE fea-

tures are also excellent. Most notably, the AppBrowser is an excellent tool for viewing information on specific classes, and even lets you store and view component properties in the pane. Dependencies are then sorted out at compile time, and components are imported back into the project where necessary.

With the release of Version 2 of JBuilder, Inprise has made it possible for developers to find all the tools they need to develop industrial-strength Java applications in a single package.

Travis Simon

Borland JBuilder 2

■ Distributor	Inprise (formerly Borland)
■ Phone	1800 632 266
■ Online	http://www.borland.com.au
■ Price	Not yet available
■ In short	Developers needing a complete Java solution need look no further than JBuilder 2.

The other half of your portable office, because it can be both a printer and scanner.

IrDA cable-less communication
for printing and scanning.



Read the features and you'll swear the BJC®-80 would use half your desktop, not half your briefcase.

Breakthrough colour technology.

It's hard to believe that colour this good can come from a printer so small.

But, that's what you get with a patented new process called Drop Modulation Technology.™

Two ink drop sizes. It produces dual drop sizes in all four CMYK inks, in resolutions up to 720 dpi. The result is smoother colour gradations and less grain on all paper types.

High speed blacks. In seconds you can switch to a special, black only cartridge with 128 print nozzles. It offers laser-like speed and text smoothing for highly finished correspondence.

Send a fax, scan in colour. Next there's the optional colour scanner head. You can simply substitute it for the printer head.

There is a high-speed mode for faxing*, and a high definition mode. The latter is ideal for colour graphics and OCR, and reads up to 360 dpi, 128 monochrome levels for OCR, and 64 colour levels for RGB.

IrDA for wireless operation. The BJC-80 accepts an optional battery pack as well as standard power. And to make your life easier, it comes with a Windows 95 infrared IrDA compatible port for cable-less communication.

Better Internet images.

The BJC-80 even includes an Image Optimisation feature that reduces the jagged images and faded colours common to Internet images, and works with a variety of graphic applications.

Canon Customer Care. The BJC-80 features a one-year warranty, upgradeable to three years for minimal cost, and is backed by Customer Care hot-line support. Drivers are available for both Windows 3.1x/95 and Windows NT.

To learn more about the other half of your portable office, call us on 1 800 021 167.



* Fax function requires appropriate software and Windows 95. Price as shown is the recommended retail price, including tax. Canon Australia Pty Ltd ACN 005 002 951. Canon, the Canon logo and BJC are registered trademarks and Drop Modulation Technology is a trademark of Canon Inc. All other trademarks are the property of their respective owners. CS/4446

BJC-80 – \$499 RRP

Canon

CanoScan FB310

The latest Canon scanner is targeted at home users; it's a tiny, lightweight device that's cheap and easy to use. Its 'quick start' guide is unambiguous and the installation instructions are also clear. The scanner has a locking mechanism (as all good-quality scanners should) which protects the mechanical parts from damage when the machine is moved; the first step in setting up the scanner is unlocking it, which is well illustrated in the manual.

Once that's done, you need to connect the supplied parallel cable to the computer and the scanner. This requires an up-to-date, bi-directional parallel cable — older ones won't work. It's also worth noting that if your computer only has one parallel port, and if you're already using a parallel device (such as a Zip drive), you won't be able to use this type of scanner without first discon-

necting the parallel device. The alternative is to either buy a more expensive scanner with a SCSI interface, or add another parallel port. But this is not a fault of the CanoScan — its an inherent limitation of parallel ports.

Installing the supplied software is simple, although it's surprising that a scanner aimed at home users isn't Plug and Play compatible. Our installation of the scanner worked perfectly first time, as did the automatic self-test. The scanner is TWAIN-compliant.

Canon's TWAIN-scanning software is a little more sophisticated than that supplied with many of its rivals. We particularly liked the choice of using it in either expert or easy mode. In expert mode you can set options such as resolution or colour depth manually, but in easy mode you simply choose between 'best scanning speed' or 'best quality'.

Rated at 300 by 600dpi, the scan qual-

ity of the FB310 showed more than acceptable sharpness, and rich, accurate colour. The unit was a little slow but it should be perfectly acceptable to those with modest scanning needs.

Although its performance was good, perhaps the most attractive thing about this scanner is the price. At just over \$200, the FB310 is undoubtedly one of the cheapest, and best value, flatbed scanners we have seen. A bargain for the cash-strapped, especially seeing as several useful software applications are thrown in.

Jim Endersby



CanoScan FB310

■ Distributor	Canon
■ Phone	(02) 9805 2000
■ Online	http://www.canon.com.au
■ Price	\$209
■ In short	A nice, compact unit which represents excellent value for money. Ideal if your scanning needs are fairly modest.

Epson Stylus Photo EX

New inkjets are coming onto the market almost faster than customers can keep up with them as the major printer manufacturers vie for market share. Customers are benefiting in two main areas — print quality and cost. PhotoRealism is now a standard offering from most manufacturers, as is a print output resolution of up to 1,440dpi. Epson's latest Stylus Photo falls squarely into this category, and its \$899 price tag keeps the cost-conscious happy.

Epson designers have built in an extra feature, in that the EX handles up to A3-size media, a capability that will appeal to design houses and ad agencies which need in-house, full-size proofs.

The Stylus Photo EX is more sophisticated than the Stylus 800, incorporating status indicator software and a higher calibre driver. These allow for greater customisation for specific applications, and for configurations for different types of images and papers. The printer casing is wider than the average A4 inkjet, but is not particularly deep thanks to some neat fold down/out paper feed and collect trays.

The ink cartridges are also easy to access, and have a claimed life of 500-plus pages for the black cartridge, and 220 pages for the five-colour cartridge. Unfortunately, photo-quality paper isn't cheap at \$55 for 30 A3 sheets.

Setting up the Photo EX is highly automated, but no print test is built into the install process. The supplied CD-ROM includes PhotoEnhance 2, for automatic image optimisation, and the LivePix imaging package, as well as the usual drivers. Epson has included some high-res scanned images, but curiously not in TIF or standard format — they seem to be in a special pre-spooled format.

The reason for this becomes evident when you use the printer. Printing a 24-bit 300-points-per-inch A4 test image can take between four and six minutes to spool (even though the image can be stored completely in RAM), and another 12 to 15 minutes to print. So don't be in a hurry for your proofs, especially if they're A3 size. You may as well nip out for a meal while they emerge. Overall, this is slower than most other photo-standard printers, but at

the end of the wait, the quality of the print-out on Epson's photo paper blows the competition away. Honey-smooth, crisp, with extremely accurate colour rendering, and not a trace of banding or speckling. More than good enough for original artwork, as Epson claims.

For the professional market, this printer completely removes the need for dramatic last-minute courier dashes to the photo lab. But don't buy one for printing your photos at home unless you like twiddling your thumbs.

Jeremy Torr

Epson Stylus Photo EX

■ Distributor	Epson
■ Phone	(02) 9903 9000
■ Online	http://www.epson.com.au
■ Price	\$899
■ In short	The best A3 photo-quality inkjet available, but in no way a lightning-fast operator.

With high speed and up to 4 paper feeds you can feed it almost anything.

When it comes to devouring stacks of paper, the BJC®-5500 has no rivals.

More paper feeds. It comes with a tractor feed to accept continuous form (computer paper) as standard, as well as a manual paper feed that will accept all sizes from A5, A4, A3 and A2, through to envelopes, transparencies and labels.

Plus you can add two optional cut-sheet feed trays, for letterhead and standard paper, or almost any other combination.

To do more jobs. Obviously the BJC-5500 has the paper handling to suit almost everyone in the office from accountant to artist, and engineer to receptionist.

Its appeal is further broadened by the fact that the BJC-5500 is also an exceptional four-colour CMYK printer capable of producing text and graphic lines in resolutions up to 720 dpi.

At higher speeds. Whether the accountant needs to

produce a long spreadsheet, or you want to print a number of letters, the BJC-5500 delivers. Using the special black cartridge the BJC-5500 can print close to 7 B&W pages per minute in high speed, or more than 5 pages per minute in high quality mode.

It even offers an ultra efficient Economy Mode that reduces ink consumption by 67% vs. high quality mode.

Extra versatile. Both colour and B&W cartridges are included as standard.

Drivers are available for DOS, Windows 3.1x/95 and Windows NT. Even a serial interface option is available. In short, the BJC-5500 has enough features to suit everyone's tastes.

Canon Customer Care. All Canon printers feature a one-year warranty, upgradeable to three years for minimal cost, and are backed by Customer Care hot-line support. To find out more about Canon's large paper handling capabilities, call us on 1 800 021 167.

Envelopes

Overheads

Computer

A4

A3

A2



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CS 4854

BJC-5500 – \$1,499 RRP

Canon

Lotus eSuite DevPack

Lotus eSuite is the first major application written in Java for the NC market. The productivity applets are remarkably useful, although they aren't without their problems (see eSuite Workplace review, *APC* March, page 30). For such an endeavour to be successful, however, companies need the ability to customise the applets to suit their needs, and this is where the eSuite DevPack enters the equation.

The good news about the DevPack is that most of the work is already done and, in most cases, the developer will only need to assemble the pieces to create an application. The basic applets, which include a spreadsheet, presentation, schedule and word processor applet, have already been implemented and do not require additional coding. A number of other applets have been included to augment their functionality. These include applets for reading files and accessing databases and CGI variables. The DevPack also comes with utility applets for creating templates needed

by the applets, and for parsing HTML contents.

The simplest way to create an application is to place an applet in an HTML file. A user can then open the URL and, for instance, create a spreadsheet, print it, and save it to disk. For more ambitious developers, multiple applets can be placed on a page and linked. Custom HTML components can also be added and linked to the applets using JavaScript. This is probably the easiest way to build custom applications using the DevPack. Although the documentation *APC* received in the beta was incomplete (read: nonexistent), we were able to build our own applications by simply studying the source for the HTML pages.

The ease with which we were able to deconstruct and emulate DevPack's examples can be attributed to Lotus' new InfoBus technology. The InfoBus is a set of protocols for passing information between Java components. The InfoBus has since been adopted by Sun, and will be part of an upcoming Java specification.

The InfoBus acts as a bridge between components, which register as data pro-

viders and/or data consumers. Information sent to the InfoBus is then automatically routed to the appropriate component, where it can be displayed, or processed further. This makes it possible, for example, to pull data from a database using the JDBC applet, and publish it with the chart applet.

The strength of the eSuite DevPack is that you don't need to know Java to harness the power of the applets. As would be expected, however, you can always leverage existing Java knowledge to further enhance the eSuite components.

Travis Simon

Lotus eSuite DevPack

■ Distributor	Lotus
■ Phone	1800 252 408
■ Online	http://www.lotus.com.au
■ Price	\$179 for single developer; servers start at \$3,007
■ In short	The DevPack makes customising the eSuite easy.

Canon MultiPass C20

The most recent entrant into the SOHO all-in-one market is Canon, with its MultiPass C20. This machine provides the standard scanner, copier, printer and fax functions in a standalone or PC-linked configuration, and adds the option of 720 by 360dpi photorealistic printing. It does not include a voice or data modem, however, so if you want the facility of voice or email, you will need a separate modem and answering machine.

Canon seems to have signed off a bit early with this unit. As well as having no voice messaging, the scanner is very slow and provides only 400dpi mono resolution at best. A standard A4 200dpi 8-bit greyscale image takes over two minutes to scan, then a further 45 seconds to upload to the application. Higher resolutions are even more grindingly slow. Although the unit can print your happy snaps in colour, you can't scan them in colour. Rather strange. As copying uses the same scan head, it can also only copy in mono. Although it is notably faster



than scanning to computer, it can get a bit smudgy when using plain paper.

Graphics resolution on printing is satisfactory, but not as good as the new HP Officejet. Results are much better when using the special photo cartridge for photo images, especially on quality paper. Printing an A4 24-bit colour print takes around nine minutes with 30 seconds spooling, but quality was excellent. Slight speckling on very flat tones was the only weakness.

As a straight photo printer, the MultiPass C20 is good, but this unit is not sold as a straightforward photo printer.

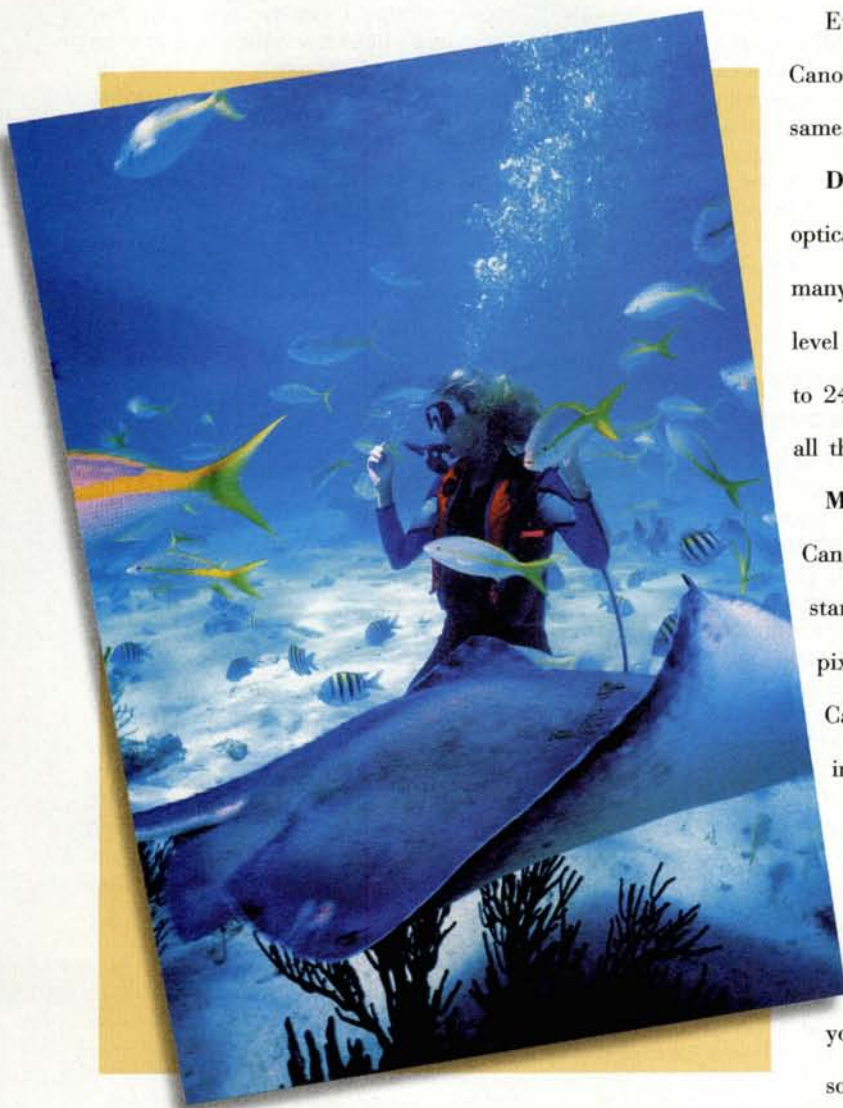
Sadly, the supplied software is nowhere near as slick as that supplied with either the Brother or HP all-in-one offerings, and has little or no integration into other PC applications. On the plus side, the front panel is simple and obvious for use as a standalone unit, but given the price and the limited communications capability, most home users would do well to look elsewhere for a true all-in-one device.

Jeremy Torr

Canon MultiPass C20

■ Distributor	Canon
■ Phone	(02) 9805 2000
■ Online	http://www.canon.com.au
■ Price	\$899
■ In short	Good as a photo printer and/or manual fax machine. As an all-in-one device, not quite there.

High optical definition and up to 30-bit colour scanning for more colour depth.



Even a quick glance at the incredibly small foot-print CanoScan™ range suggests that not all scanners are quite the same. Look more closely and you'll find even bigger differences.

Definition up to 8000 dpi. Canon scanners start with true optical definition as high as 1200 dpi, up to double the level of many direct competitors. This high optical level can then be enhanced up to 2400 dpi, and interpolated all the way to 8000 dpi!



Extremely small foot-print.

More colour depth. Equally important, Canon has discarded the 24-bit colour input standard. Instead, our models scan up to 30 colour bits per pixel, to read as many as one billion colours! This allows Canon scanners to keep only the most useful bits of colour information in each pixel when it comes time for output.

Superior lighting. A unique Xenon lamp further aids our colour quality. It more closely resembles sunlight to provide even illumination and more natural light for better colours.

SCSI included. CanoScan packages come with everything you need to get started. This includes image editing and OCR software, a high-speed SCSI-II interface card & cable, and a TWAIN driver as standard.

Canon Customer Care. All CanoScan scanners feature a one-year warranty, upgradeable to three years for minimal cost, and are backed by Customer Care hot-line support.

If you would like to learn more call 1800 021 167.

Model	CanoScan 300	CanoScan 600
Interpolated Resolution	Maximum: 4800 dpi	Maximum: 8000 dpi
Enhanced Resolution	1200 x 1200 dpi	2400 x 2400 dpi
Optical Resolution	600 x 300 dpi	1200 x 600 dpi
Colour Input	27-bit (9-bits per colour)	30-bit (10-bits per colour)
RRP*	\$439	\$799

*Prices shown are the recommended retail price, including tax. Interpolation dependent on driver and software used. Canon Australia Pty Ltd ACN 005 002 951. Canon and the Canon logo are registered trademarks and CanoScan is a trademark of Canon Inc. CS/5112



Canon

Current affairs journalism

Regarding Tony Adermann's letter to Forum [APC April, page 40], I too am wary of "cheap current affairs" style consumer investigations. However, I believe that the Service & Reliability and Price Watch columns provide a welcome service to readers and consumers. I for one am tired of being shafted by ISPs, computer wholesalers, software wholesalers and software companies. I have lost count of the number of times that I have bought a product or service, only to be let down after handing over the cash. And the majority of my friends who own computers have had similar experiences. Why should owning and using a computer be an arduous, and often costly, trial and error experience?

Very briefly, my dissatisfaction has arisen from the following:

1. ISPs: Overcharging, not providing adequate technical support, failure to serve a satisfactory or reliable connection.
2. Computer wholesalers: Not living up to their guarantees, providing inadequate support, trying to charge for repairs that should be covered by the warranty.
3. Software wholesalers: Refusing to

refund on faulty items and/or not providing any technical support.

4. And the worst offenders are software companies, which, among many things, either charge exorbitant rates for technical support (for example, Microsoft; too bad if you aren't on the Net and able to access the Product Knowledge Database), and/or provide (or often not) vague, misleading or inconsistent support.

William Bullimore
Internet

Money doesn't make the world go around

I would like to share an unfortunate experience that I had not long ago. Some two years ago, I purchased my first PC and some software packages, most of them Microsoft products. One of these software packages was Microsoft Money. Since then I have come to depend on this program to follow all my finances.

At the beginning of December a friend told me of a new release of Money, and I found the Money 98 beta in a magazine. I couldn't wait to install it on my PC. When I tried to run it I found I had to convert my records to the new format, and I kept a

backup of this. I ran the beta for a few weeks and I liked it so much that as soon as I had enough money to buy Money 98, I did so. But when I installed it and tried to run it, my new program could not read my backup.

When I called the help line and explained the problem, I was told that the beta program I had tried had been made in the US, while the program that I had bought was made in the UK, and the two versions are not compatible. They were very sorry, but there was no solution to my problem, and I had lost all data that I had entered in the previous month. Thank you, Microsoft, for disappointing me. I believe that Microsoft should warn users that this could happen.

A & J Bonora
Internet

West is best

I have been very interested reading comments on ISPs. Here in Perth there are a number of ISPs which provide a full service with unlimited downloads and no time limit for a monthly fee ranging from \$25 a month. My ISP is a little more expensive, but it also includes space for a home page. I think we're lucky here in the west. Just don't come here and crowd us too much!

Rosemary Horton
North Perth, WA

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Corrections

In APC's May special, the Internet SuperGuide, details for Zip were left off the table on page 160 due to a printing error. We regret any inconvenience caused. We also incorrectly stated that Microplex provides a maximum connect speed of 56Kbps (K56Flex). These are the missing details for Zip:

Phone: 1300 655 577

Web site: <http://www.zip.net.au>

Maximum connect speed (Kbps): 56 (K56Flex)

Points of presence: 8, plus global roaming

User-to-modem ratio: 8:1

Network links: 1Mbit to Telstra Internet, 1Mbit to Connect, 2Mbit link to US, 2Mbit to OGN, 1Mbit to AUIX and AusBone

Most popular pricing plan: \$50 set-up fee, \$39 per month for 150 hours, or \$29 per month for 40 hours

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Resolution is almost 30% higher than any direct competitor, and the white balance system produces "true-to-life colour and minute details" (Australian PC World, April 1997.)

Superior storage. It features the widest range of storage and compression options – from economy mode to "uncompressed" for better pictures. Storage even includes a built-in voice annotation system.

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"Of all the digital cameras we've tested, Canon's produces the best looking images..." Australian PC World, April 1997.

"The first digital camera we've seen (that) produces sufficiently high resolution and high quality images to survive digital manipulation..." Windows Sources, July 24, 1996.

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Canon



A matter of trust

Would you let someone else decide who you could trust?

Well, you do already.

By Helen Dancer

How do you know you can trust somebody? The question is worth considering alongside the issue of Net privacy and public use of personal information.

Trust, in my mind, implies a personal relationship. It would be much harder, for example, to trust someone you had never met than someone you had seen in person. But it would be less difficult to trust someone you'd had phone conversations with over a sustained period of time than someone you'd only communicated with by email.

This probably has something to do with the amount of non-literal communication that takes place when you make contact with another person. Body language, eye contact, tone of voice — all are intrinsic to rapport, and when they are removed from the equation, it's hard to say you know a person at all, let alone enough to trust them.

So how would you decide you could trust someone you'd never met? Would you trust them because your parents/partner/best friend trusted them?

Well, that's how I chose my bank, my accountant and my lawyer, which either means I'm extraordinarily indiscriminate in this regard, or that it's valid to treat the trust process like a web matrix, with varying degrees of relativity.

The question of how *much* you trust a person is conditional on every incident in the trust matrix. If you trust someone and they let you down, the trust meter falls by degrees, depending on the extent of the breach, until the tank is empty.

If the entity in question is a service provider, the value of your business will be part of the trust matrix. The provider is less likely to let you down if it places a high value on doing business with you, or if you have easy recourse to alternatives if you find you are not satisfied.

There's an element of limited liability too, in that if you 'trust' a service provider with your credit card number, and the

provider exceeds the implied bounds of the transaction, then you have recourse, either through your relationship with the issuer of the credit card, or the Trade Practices Act.

But these are all one-to-one trust relationships. Would you be happy allocating your trust by proxy? Letting someone you'd never met decide to trust your information to someone they might never have met?

Well, you may have done so, and you probably just didn't know it was happening.

In the rarefied atmosphere of the WWW7 conference held in Brisbane in April, there was much discussion about the issue of privacy and the security of personal information. The P3P — Platform for Pri-

you can make assumptions, but really, you don't know.

'Use-conditional' was one of the phrases gaining currency during the P3P discussions at the WWW7. If you provide your credit card number in order for someone to send you a canoe, then you want to be sure that sending that canoe is the only use made of that information, says Web founder and W3C member Tim Berners-Lee. He envisages a future RDF engine that includes a digital signature, a provision which will ensure that providing information is use-conditional, and restricted to a given transaction.

Rather than meaning that you'll have to

The question of how much you trust a person is conditional on every incident in the trust matrix.

vacancy Preferences Project — is an ongoing working group whose charter is to develop adequate mechanisms for protecting the privacy of people like you and me.

It's too easy to equate data security with personal privacy. There's more to the issue than making sure no-one has access to stored details about yourself such as those held by the ATO, the transport authority in your state, or your bank. It needs to cover everything, including the right to have a conversation without being intercepted, and the use made of information supplied by you on a one-off or use-conditional (see below) basis.

When you go to a PC show, or any other such forum, increasingly, you'll receive a swipe card as your registration badge. What information is on the card? You assume it's your name, address, position, company, and so on — information that you've supplied on the registration form. What use is made of the information during the show, and afterwards? Again,

provide your credit card number or birth date over and over again for the same sort of transaction, however, it implies that you'll be able to develop a complex personal profile or 'information fingerprint', and either vet or allow access to certain levels, depending on the trust relationships you build up.

It's a notion Berners-Lee described as a 'web of trust', but he warned at the same time that technology couldn't replace policy. The last thing the project team wanted was a government buck-pass which said that 'since there's P3P technology out there, we don't need to legislate', he said. On the contrary, he would like to see specific laws which mandated that third parties, such as ISPs, were not allowed to provide information about you.

The ability to negotiate away those rights with consent is another issue. What's it worth? That's a very personal question, one which won't be answered either by technology or by legislation. And one which is probably best left for another 60 seconds.■

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Doing your homework

You don't have to go to work to be at work. So what is it that's still pushing you into the traffic?

By Jeremy Horey

In March I finished my 10th year as a telecommuter. Coincidentally, I found this quote in the March issue of *Wired* magazine: "Downtown office buildings have become dysfunctional. As information and ideas have become mobile, the kind of work that doesn't require contact with customers or contact with other professionals — in other words, 75% of the work in any organisation — doesn't have to be downtown." (Peter Drucker interview, *Wired*, March 1998.)

If you regularly have to spend any time in peak-hour traffic, you may feel that Drucker's words are just what you want to hear. Our cities are built around a core of office blocks. Hundreds of thousands of workers move into those office blocks every weekday morning and out again every weekday afternoon. They are so used to this that they don't even consider how absurd it is today.

Once it was important to have the office workers in an organisation clustered together in a single area. Moving paper around from one worker to another wasted time and money. It was hard to organise meetings with people in different buildings and general communication became harder the further apart people were placed.

But keeping people together also has its costs. Real estate costs have skyrocketed and central business districts have become very expensive places to have offices. But what are the advantages of having an office in the centre of a city? There are no services that make a city centre unique. Telecommunications and couriers move information and goods around just as easily whether you are in a city centre or elsewhere in the city. And most centres are so large that if you do have to meet someone from the other side, it is faster to take a cab than to walk.

Of course, for some organisations there is a need to be centrally located; law firms need

to be near the courts, for example. But there are very few other institutions that need to be there. However, no matter where an office is located, it is worth thinking about telecommuting or teleworking. As Drucker points out, most workers don't need regular face-to-face contact with customers. They do need regular face-to-face contact with co-workers, but probably not every day.

The tide of telecommuting has ebbed and flowed in Australia. Five years ago telecommuting was a hot topic, and Telstra and other public service institutions were conducting their own trials. But this seems to have had little impact. There has been a marginal increase in telecommuting, mainly in small-to-medium businesses; but in large organisations, the number of teleworkers has remained almost constant over the last two years. And yet the technology and infrastructure to achieve effective teleworking is better than ever. Internet access is available at a very low cost in all urban areas. Modem speeds are up, PC and printer prices are down to their lowest ever, and the software to support remote access to networks is more robust and powerful than ever.

There is just no comparison to what was available when I started my telecommuting career. I had a 2,400bps modem and a piece of software called Carbon Copy, which allowed me to transfer files between my office network and my PC at home — or at least between the PC running Carbon Copy at work and my PC at home. If I wanted to give anyone else access to a file, I had to ring up and get someone to move the file. There was no email and no Internet. My most prized possession was a CD-ROM from US computer publisher Ziff-Davis. It cost \$1,200 a year and gave me something like a cut-down version of the software that is now available for free at ZiffNet on the Internet.

Today, I have universal email through the Internet, a 56K modem with a fast con-

nection to the Internet, and the ability to dial into my office network and have full access to all the resources on the network that I have permission to use. So if the technology is getting so much better, why isn't telecommuting taking off?

Part of the reason is that we are not as enthusiastic about telecommuting in this country because we don't have the same commuting problems that are driving the adoption of teleworking in the US. But in addition, there is a large dollop of conservatism in the Australian workforce and among Australian management. While I have usually only telecommuted one day a week, I have often been surprised by management reaction.

I have always negotiated teleworking as part of my employment agreement, which makes it acceptable in management's eyes. But whenever I have suggested that one of my fellow workers should be allowed to telecommute, management has immediately rejected the idea. It could be that I am a bad judge of character and management is more far-sighted than I. However, I suspect that this is not the case.

Most managers find telecommuting a threatening concept. They seem to feel that as soon as a worker is out of sight, they will stop working. This makes sense of the statistics. In small organisations, managers must trust their workers more than in large companies. In a small business, the individual worker is more important and a manager will work harder to keep them happy. This would explain why telecommuting is more common in small companies.

Attitudes need to change. Telework is an important way to make workers happier and more productive. If we are to make Australia more competitive, we should look more closely at telecommuting as an option for more employees.

You can reach Jeremy Horey at jhorey@ozemail.com.au.

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Gloom-free zone

It's hard being a columnist. Beseated by news from around the globe of pestilence, fever and — even worse — pies in the face of our heroes, the heat is really on to upstage the doomsayers.

By Jeremy Torr

Every month we try to produce a pithy prose package, oozing with dark foreboding, finger-wagging predictions about Intel folding, Microsoft being sued silly or even Alston becoming computer literate. Dark times indeed. But, hey, I don't feel like being wintery. Darkening evenings, heavy jumpers and misty mornings (well, in Melbourne anyway) can get lost — I've discovered something to get really excited and optimistic about.

So what's this new beacon of hope in the computer industry? Digital photography and imaging. Only a few of years ago, it looked like the course was pretty well set for computers. Designed primarily for business users, hardware options were being thinned down to a mere handful of serious manufacturers. Software-wise, things were even less promising. Microsoft was moving inexorably into a total domination situation. Nothing could save us. But then some canny companies like Logitech, Apple and Dycam decided that one really good way to use the computer would be to stick images on it. Not through a scanner, but through a camera that could take photos which were downloadable directly into a computer.

Admittedly, the first attempts were execrable; they were dotty, blotchy and very slow to download, which meant it was only the real bleeding-edge pioneers who bought them. But then something quite rare (for the computer industry) happened. Manufacturers outside the rather incestuous computer industry started to get in on the act: names like Ricoh, Olympus, Agfa, Nikon, Kodak and Pentax. The real breakthrough was that these companies came to the digital photography business from a consumer point of view, not from the nerd perspective, which hung everything off pixel strength, bit depth and algorithm integrity.

No sir. They designed cameras that worked as cameras. You could simply switch them on and take photos with them. They had simple controls and didn't need booting, configuring or encouraging to work with Version 2.015 of the software. They were snapshot devices with a digital film, not computer peripherals with associated jargon that could coincidentally take a picture. And the shock was that they sold.

Despite the blurry pics of the first and second generations, despite the agonisingly slow download times and despite the wallet-crunching initial costs (of course, film costs were now zero), consumers couldn't get enough of them. Many major computer stores simply ignored them because they weren't geeky enough — you couldn't fiddle

incremental grey box development.

But the real spark of light at the end of the tunnel was that digital cameras brought their own revolution to the computer world. Instead of being subverted into the amorphous chip-ridden, cream/beige, keyboard dominated, rectilinear computer design school, the opposite happened. They looked good and worked well, and were so successful that they made PC makers take notice.

If you buy any new computer today, the chances are it will have some kind of quality graphics display. It will most likely have an imaging package that can take digital photos and archive them. It could even have a CD writer as standard, because so many users are now using CDs instead of plastic-sleeve photo albums. In

So what's this new beacon of hope in the computer industry? Digital photography and imaging.

with the software, adjust the RAM addresses or reconfigure the INI files. So photographic shops sold them, and sold heaps, to people who didn't want to adjust RAM, didn't know what an INI was or even why an RS232 was called a serial port; they just wanted quick and easy snaps they could email to granny or use to illustrate real estate brochures.

Consequently, the cameras were designed to look and work like ordinary cameras. They connected without special hardware, and even spawned a new style of compact memory card that allowed images to be loaded into notebooks in the same way as you'd flip through an album. All this was achieved because the designers came from a consumer-oriented, cross-market design school, rather than one which had grown up around the Mars/Jolt/Biro-in-shirt-pocket faculty of

some cases, the system will even come with a built-in slot to take image cards. And if a printer comes with it, it will, in virtually all cases, be an inkjet, which can not only churn out the weekly letters but also print photographic-quality images.

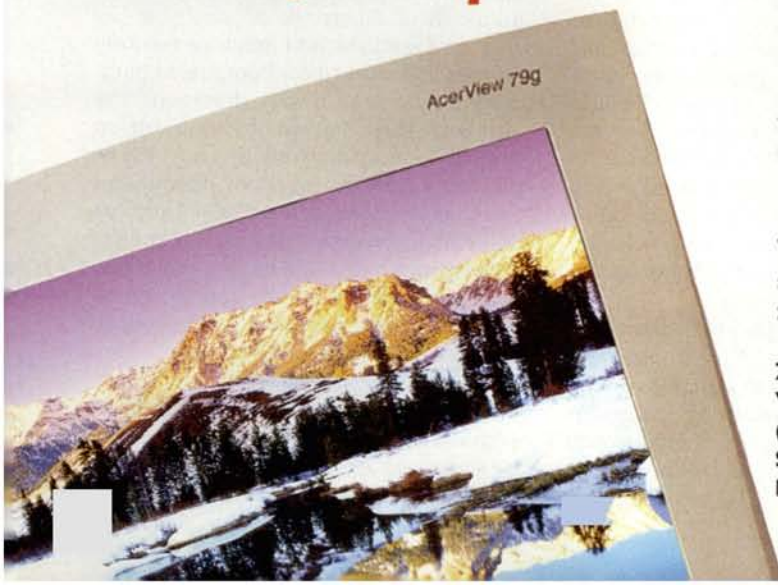
The improvement in inkjet photo output quality over the last year has to be seen to be believed. The amazing thing is, most of these aspects are directly related to the remarkable success of the digital camera, and its ability to turn the computer into a useful tool for the ordinary snapshooter.

So there you are. A glimpse of something bright, dynamic and exciting in the world of computing. Admittedly, none of the pioneers are major players in the rapidly expanding camera market right now, but it's really hard to write a whole column without just a teeny bit of gloom and doom. ■



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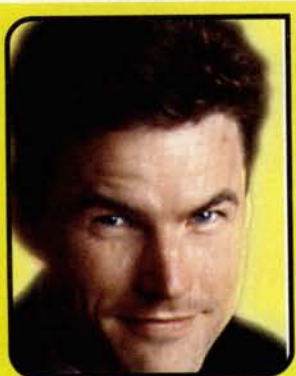
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Trickling down

Last year, Australian buyers took delivery of over 1.6 million new PCs. The year before it was 1.4 million. Pretty impressive numbers really. The thing is, our research also tells us that most of these machines are destined to replace older PCs.

By Bruce McCabe

This is probably no surprise to the business sector, where we have become used to regular replacement cycles; but it is a newer trend in the consumer world, where middle and high-income households are gradually being 'saturated' with technology and falling into a regular pattern of replacing hardware as it becomes obsolete. So where do the replaced machines go?

A 'trickle down' effect keeps many of the machines that are being replaced in circulation. In the workplace, IT managers often send email around to staff offering the older machines to employees for a few hundred dollars apiece (the pace of technology development ensures that old PCs lose value fast). If the machines are being leased, they are returned to the finance company, which resells them, if possible, to users with less demanding technology requirements — again, for a very low price.

When getting a few dollars for old hardware is impossible, the fallback strategy is to give it away to charities or educational institutions. While well intentioned, this doesn't always work: if the PCs aren't worth anything in the business world, they are probably not much use to charities either, and schools are unable to use them as effective learning tools because the technology is too far behind the 'real world'.

The same phenomenon applies in the consumer sector. Parents often buy a computer to replace the one they are using, and relegate the older one to games or educational purposes. This is usually acceptable for younger children, but doesn't always work with older ones because the latest entertainment software usually demands more power than the applications their parents are running.

Household PCs are also recirculated via

the second-hand market. They are traded in for new machines or sold privately through local newspapers or publications such as *The Trading Post*. They are then bought by families or small businesses with low budgets and/or less demanding technology requirements.

The trickle-down effect can only go for so long before the older PC inevitably becomes useless to just about everyone as a general-purpose machine, although there are some admirable exceptions where older technology can be perfect to accomplish a specific task. In

When there is simply no further use for them, where do computers go to die?

November 1996 (see *APC* November 1996, page 76) I cited the real example of someone who spent \$350 on a second-hand PC with word-processing software to write their university thesis, then throwing it away two years later when the job was done.

Another element of the trickle-down effect occurs with components that survive to be reused when the machine is thrown away. This is especially true of monitors, mice and keyboards. More rarely, hard-disk drives or CD-ROM drives are kept to be installed in a new machine. Even the casing may survive when the user chooses to upgrade motherboard, processor and memory. Buyers that have been through a couple of upgrade cycles know, however, that it is often easier to simply buy a whole new machine.

More modular designs which allow each of the key elements of a PC to be unplugged and replaced promise to improve component recycling in future. (If old computers weren't so ugly, I'm sure we could recycle them for all sorts of other things: book ends, coffee tables, speaker stands and door

stops; but there is no denying it — almost without exception PCs are large, drab, grey and awkward. Strange how something that represents the pinnacle of engineering and modern manufacturing has absolutely no charm whatsoever.)

What about the final stage? When there is simply no further use for them, where do computers go to die? For me, at least, this is where the mystery deepens. At Gartner Group, we take a strong interest in the number and characteristics of PCs still in circulation, because our clients want to understand just how large the 'popula-

tion' is (ISPs are interested in how many people they can target, peripheral suppliers want to assess their potential market, and so on). Research on where PCs go after they reach the end of their useful life, however, is almost nonexistent as it holds little commercial value.

We do know the number of PCs taken out of circulation must now be very large: hundreds of thousands of machines per year. I've seen the odd machine (usually covered in dust) at a car boot sale or gathering mould in a friend's storeroom. I've also seen them left on the footpath on council clean-up days. But this can only be the tip of the iceberg. Does anyone out there actually collect dead PCs? Drop me an email if you ever spot a big stockpile of 286s somewhere — I'd be very interested. And while we are on the subject, I'd be really interested to know what happens to all those dot-matrix printers too . . .

Bruce McCabe is senior industry analyst with Gartner Group/Dataquest. He can be contacted at bruce.mccabe@gartner.com.

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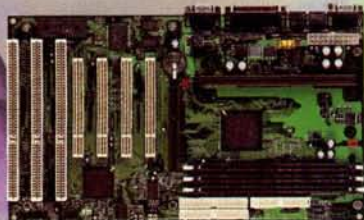
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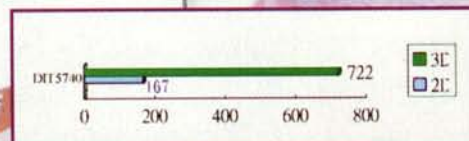


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Antivirus software is like insurance for your PC.

Gremlins in the system

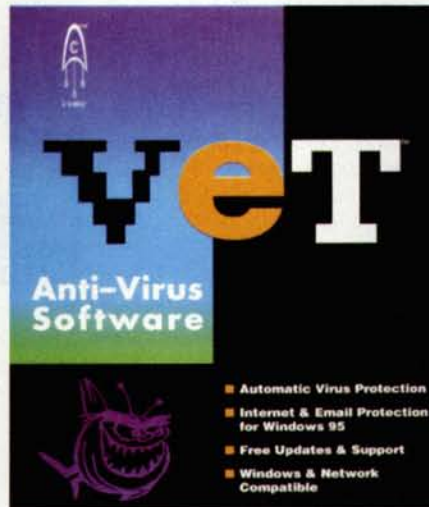
Generally people buy antivirus software 'just in case something goes wrong', then forget about it until something does. However, despite its crucial preventative role in protecting your data and the health of your system, Price Watch discovered that it isn't only consumers who lack knowledge about leading antivirus software.

There are thousands of viruses and they spread across the globe rapidly, thanks largely to the Internet, where they can be hidden in legitimate and pirate software, downloaded freely from any one of hundreds of huge online virus repositories, or simply sent whizzing across the ether via an infected email.

The traditional means of getting a virus — sharing diskettes or copying software illegally — are still just as dangerous as ever. However, sharing documents like Word and Excel files, especially via email, has made macro viruses prevalent.

Price Watch this month investigated antivirus software, and asked retailers basic questions about viruses and the products available to combat them. Despite there being more than a dozen or so well-known antivirus products available in the Australian market, we were directed towards a total of five products by the nine vendors.

Symantec's Norton AntiVirus Gold was by far the most frequently recommended



product, suggested by eight out of nine vendors, mainly because of its 'good name', as one salesperson put it. The fact that the majority of salespeople knew and liked its update system (users can download and install the latest antivirus definition on their system at the click of a button) indicated just how visible this product is in the retail and consumer channel.

Locally manufactured Vet came a distant second with three recommendations, all of which cited the fact that it was an Australian product as the determining factor in their recommendation. McAfee's VirusScan also scored three recommendations. Dr

Solomon's Anti-Virus was suggested by the salesperson at Harvey Norman in Queensland, who claimed it was "renowned worldwide as the best", though he didn't own a computer and couldn't vouch for it personally. The sales representative at Sotinnie's in the Northern Territory was a diehard IBM AntiVirus user, emphasising that it did a superb job in detecting viruses, particularly on the Internet.

The antivirus market appears to be extremely competitive. Prices varied by only a few dollars and tended to be less than the recommended retail price. What was disappointing, however, was the dealers' lack knowledge about the products they recommended so highly. Many had some knowledge of one product, particularly the salespeople from City Software, Sotinnie's and The Software Cellar, who were obviously users of the products they recommended. But generally they were unable to explain how the product they recommended compared with competing products. Only the salesperson from Software Today in Melbourne provided an outline of the general performance of Nav, Vet and McAfee.

There was also plenty of misinformation from salespeople; some suggested there was no difference between the various products except their names and packaging, and others wrongly implied that

Continued on page 58

Antivirus software

Company	Phone	Recommended	Price
Citisoft	(08) 8373 5000	Vet Anti-Virus Premium, Norton AntiVirus	\$109, \$99
computers + more	(03) 6228 5909	Norton AntiVirus Gold	\$99
City Software	1300 658 435	Vet Anti-Virus Net Surfer, Vet Anti-Virus Premium, Norton AntiVirus Gold, McAfee VirusScan	\$85, \$99 \$89, \$75
Corporate Software	(02) 9725 3700	Norton AntiVirus Gold	\$84
Downtown Software	(02) 9252 2575	Norton AntiVirus Gold	\$95
Harvey Norman	(07) 5444 8277	Dr Solomon, Norton AntiVirus, McAfee VirusScan	\$99, \$99, \$99
Software Today	(03) 9801 9900	Norton AntiVirus Gold, Vet Anti-Virus Premium, Vet Anti-Virus Net Surfer, McAfee VirusScan Deluxe	\$89.95, \$99.95, \$79.95, \$89.95
Sotinnie's Software Xpress	(08) 8927 1900	IBM AntiVirus	\$89
The Software Cellar	(03) 6229 8288	Norton AntiVirus Gold	\$99.95

You've paid thousands of dollars for a PC only to find that the vendor still has exclusive access to one important part of your system: the BIOS. By Roulla Yiacoumi

Who owns your PC?

After forking out thousands of dollars for an item, most customers would consider that item to be theirs. Whether it is a car, a fridge or a piece of jewellery, once that item has been paid for in full, it belongs to the buyer.

Does the same apply to computers? This was the question posed to us by a reader who discovered that after buying a PC, he was unable to make changes to the BIOS as it was password protected. Does the vendor have any right to restrict you from accessing any part of a PC after selling you the item?

A spokesperson for the Australian Competition and Consumer Commission (ACCC), the federal body which monitors anticompetitive behaviour and unfair market practices, said it would be good business practice for vendors to inform customers of any such restrictions or limitations. If the customer then disagrees with any such practices, they can discuss it with the vendor prior to purchase.

A note: It seems that some PC buyers think that because a machine is under warranty, absolutely anything that goes wrong with the system is automatically covered by this warranty. If you want to make alterations of any kind to the BIOS or any other part of your system, you do so at your own risk. If you inflict damage on your PC, even if accidental, do not expect the vendor's warranty to cover this.

Dear APC,
A few months ago I bought a new PC from Computers Direct Australia and to my dismay found my BIOS was password protected. I promptly called the company and asked for my password, only to be informed that the BIOS was protected for my own good. The operator said he was worried that I was even aware that the BIOS was protected and asked what the hell I was doing in there anyway.

I was told that I could have the password

once the warranty had expired. I am no PC expert, but I am of the opinion that if I pay \$3,500 for a PC, I am buying the whole PC, not an expensive limited-access machine.

Do you believe that a vendor is within their rights to withhold the BIOS passwords of all their customers? Should they make it known in their sales documentation that this is their practice?

At one point I was given an incorrect password by Computers Direct simply to get me off their back. I am more than a little miffed about being lied to and treated like an imbecile.

Jason Ferris
Bexhill, NSW

APC contacted Computers Direct Australia seeking an explanation and clarification regarding this issue. We were told that the company did indeed password protect the BIOS and that since doing so, customer service calls received by the company had dropped significantly. When asked if this BIOS password-protecting

practice was made known in its advertising literature or whether prospective buyers were told of this, the answer was 'no', as most users would not be concerned whether the BIOS was password protected or not. Here is the written response we received:

Dear APC,
There is really only one reason behind our decision to put a password on the BIOS — protection. That is, to protect the customer from accidentally entering the

BIOS and changing settings that could damage components or prevent their computer from booting or working properly.

We also have a password on the BIOS to protect our service department from receiving lots of calls which are largely the result of



inexperienced customers changing settings they don't fully understand. These include performing a low-level format, altering the interrupt conflicts and setting incorrect RAM speeds, to

name a few.

Like the article by Jeremy Torr in APC's December 1997 issue, we have also found that "as long as a PC works, an amazing number of users aren't really that interested in what is inside [the computer]." Most people don't care or even know what the BIOS is. And if they do happen to enter the BIOS and can't go any further, they turn their computer off and forget about it.

Continued on page 59



Tell us all about it

Service & Reliability is APC's consumer column. We invite you to send details of your buying experiences to:

email complaints@acp.com.au
fax Service & Reliability at
(02) 9264 6320
mail Service & Reliability,
Australian Personal
Computer, Level 8, 54 Park
St, Sydney NSW 1028.

Please keep your letters to no more than 300 words. All letters must contain a full name, address and contact phone number.

APC reserves the right to edit any submitted material for length and clarity.

We can publish only a selection of letters each month and regret that letters cannot be answered personally.

Who owns your PC?

Continued from page 58

For the people who do know about the BIOS, half of them only want to play around with it, which can be very dangerous. For example, if RAM speed is changed, it could cause the computer to become very unstable. All computers are 'burnt in' for at least 24 hours prior to delivery with proven reliable settings, taken from many years of experience.

If the customer needs to add a new hard drive, more RAM or whatever, the BIOS has been set up by Computers Direct Australia to automatically detect any additions or subtractions of components. No intervention is required. For the few genuine 'power users' who know what they are doing and wish to make changes, we are more than happy to supply the password.

As to your reader, we apologise. He was speaking to the sales department who didn't have all the facts and details. We use several passwords and he was supplied with the incorrect one for his system. It wasn't 'simply to get him off our back'.

Shane Wild
Computers Direct Australia

Gremlins in the system

Continued from page 57

every antivirus product could be updated free via the Internet.

Also, despite asking basic questions and inquiring as to which virus checker was the best and why, not one salesperson suggested that we go online and try a demonstration copy of the software before making a purchase.

Price Watch recommends that you research the following critical points when shopping for antivirus software, none of which were mentioned by any of the salespeople we talked to.

1. Buyers should confirm the product's ability to scan and detect viruses within compressed files. Many of the top programs are not competent at scanning any form of compressed files, let alone password-protected ZIP files.

2. Another vital feature to look for is a start-up and shut-down scan such as that found in PC-cillian (which wasn't recom-

Empire strikes out

It's been a long time coming, but the NSW Department of Fair Trading (DFT) has finally named Sydney-based computer vendor Empire Systems as an "unfair trader" and warned potential customers not to buy computers from the troubled company.

Empire Systems, which advertises extensively in newspapers Australia-wide, appointed a voluntary administrator in early April to help sort through its financial mess.

The Director-General of the NSW DFT, David O'Connor, said that even though an administrator had been appointed, this did not mean the company would cease trading. "Despite frequent warnings by the department, Empire Systems has not satisfactorily addressed complaints and there is no alternative but to warn customers not to deal with it," he said.

Since January 1997, the NSW DFT has received 220 complaints against Empire Systems — 81 coming in the two months prior to the department's 'naming' announcement.

When asked why the department waited so long before warning customers to avoid Empire Systems, a spokesperson for the NSW DFT said the company had to be given every opportunity to correct any problems.

Gripes received by the department against Empire Systems include matters

such as poor after-sales service, lengthy delays in warranty repairs, ineffective complaints-handling procedures, the supply of faulty computers, and the non-delivery of hardware and software.

This action by the NSW DFT is the latest in a string of headaches for Empire Systems. As APC reported in February (page 49), the Australian Securities Commission (ASC) sought to ban the director of Empire Systems and her husband from ever managing an Australian company. The ASC claimed that between them, Rohyeh Rohani and her husband Misagh Roussi had 18 failed companies, a number of which were computer-related businesses.

But Empire Systems fought back, launching its own action against the ASC in the Supreme Court, rejecting claims that it was a 'phoenix' company (as in 'rising from the ashes to live again'), and adding that it was a successful business shipping 600 computers a month, turning over profits to the tune of \$26 million a year. We will keep you posted on the outcome of this legal feud.

APC's Service & Reliability column first published a letter from a disgruntled Empire Systems customer in November 1997. Following publication, Service & Reliability received numerous letters from other unhappy customers across Australia.

mended). This is critical if you are the type of person to absent-mindedly leave floppy disks in your drive when you close down your machine. Booting up with an infected floppy in the drive can prove fatal without this handy feature.

3. The most important thing to keep in mind when purchasing any antivirus software is how often the manufacturer keeps it up-to-date. There is no point buying software that won't combat viruses that are created after you purchase the software. Consider how often the product is updated and whether or not these updates are free.

This is where the products varied most noticeably, from Nav which offered free unlimited updates for the life of the software via the Internet, to Dr Solomon's Anti-Virus, which at the time of writing required you to pay \$139 per year for monthly mail-outs and support or \$49 for 12 months' worth of online updates.

How often updates are posted is also indicative of how well protected you will be after you purchase the product. It may be updated on a regular basis, for instance

monthly, as is the case with Norton AntiVirus, or there may only be occasional updates.■

Our charter and method

Price Watch is an exercise in comparative technologies, relative prices and human nature. All investigations are conducted anonymously, and records are kept of conversations. Prices and system capabilities printed here are provided by the sales staff at the offices we contacted, and all information is as supplied. While we assume that these are correct, we cannot accept any responsibility for errors or omissions. Neither will we be held to account by companies mentioned here for omissions to product ranges or system capabilities. The responsibility rests with sales staff to provide adequate information, as the company would expect them to do with every customer.

More sophisticated accounting software means greater business benefits. **By Jason Daniels**

The evolution of accounting

In the world of small business it's difficult to find the motivation to get your records together, because there are always more important things to do. Until recently, accounting software aimed at small to medium-sized enterprises (SMEs) did not necessarily make it any easier to maintain those records, let alone derive anything useful from them that would help the business.

In the past few years, however, accounting software has evolved to the point where it is possible to not only maintain accounting records, but also to obtain useful information that assists in making important business decisions. There are several reasons for this evolution of accounting software. Today any small business that is *not* maintaining its own accounting records on computer is the exception rather than the rule.

Previously, DOS-based accounting packages made it hard to get interested in processing your own accounting records, so for people running their own businesses but lacking the time or desire to learn the application, it was a difficult proposition. Many older accounting packages also had report writers that were difficult to use, and reports that were difficult to understand. The result was that many packages were used solely as tools to present the accountant with records each year that could be turned into a tax return or statutory accounts.

Significantly, many of these packages were not year-2000 compliant, and the Millennium bug has probably done more in the short term to boost sales of accounting software than any other factor. We will most likely see this trend continue right up to the new millennium. This impending deadline has seen many users who were comfortable with their current software to upgrade or change applications. They have moved to modern applications which are not only year-2000 compliant, but which have powerful new features.

A common mistake when selecting these new accounting packages has been to choose the 'natural upgrade path' for a product. However, in many cases this product does not provide the optimum solution for the user and is not always the best exam-



ple of present-day accounting software in terms of cost, functionality and usability.

The advent of the graphical user interface (GUI) has made accounting packages not only more interesting, but also more intuitive for the average user, reducing the need for formal training. Online help and step-by-step tutorials have helped to educate users to ensure that they are willing to work outside the basic functionality they have used in the past. In this way business owners get the most out of their packages and the best possible return on their investment.

Reporting facilities that can supply users with useful information about their business in turn provide the motivation for users to keep up-to-date. Report writers have become simple to use and come in a format that is easy to read and understand. Drill-down and interrogation facilities provide combinations of reports specified to the users' requirements in seconds. In this way, the package is used as a management tool.

While it was already available in most DOS-based accounting packages, the ability to export data directly to Lotus 1-2-3 and Microsoft Excel spreadsheets has been made easier in the Windows GUI. The ability to link the spreadsheet 'live', or directly to the database underlying the accounting package, has been made simple in many of the more advanced packages now on the market; any change in the accounting package will automatically flow through to the spreadsheet. This is a very useful tool and takes the hard work out of updat-

ing reports such as budget comparisons, or any report where actual results are included. This type of technology is still to be embraced by the wider accounting community, but as that happens it will reduce the time taken to produce reports and take some of the frustration out of management reporting.

Much of this increased functionality has come about through the need for software developers to maintain a competitive advantage. For example, the intense rivalry between QuickBooks and MYOB has benefited users, as both developers have added features, making their products more useful while retaining very reasonable prices.

Where will we see accounting software go in the future? The Internet has been with us for some time now, and more companies are starting to see the benefits of using it to conduct commerce. To that end, accounting products aimed at the high end of the market are including features that automatically produce an invoice, update accounts receivable, and update inventory records when an order is received via a Web page. As the popularity of Internet commerce grows and is embraced by small business as a common medium for doing business, we will see accounting packages for SMEs including Internet commerce accounting solutions.

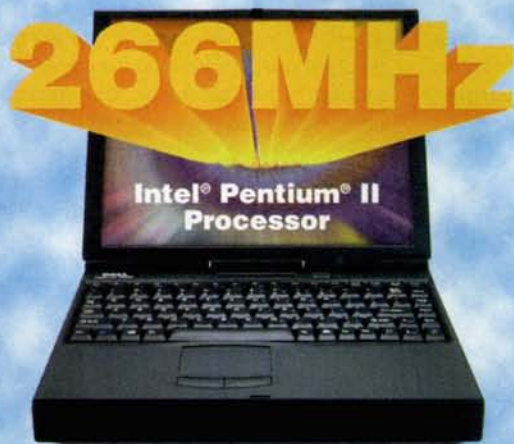
However, electronic commerce is not limited to Internet commerce. Accounting packages geared to the lower end of the market are already starting to include interfaces to point-of-sale systems and electronic banking. Banks are also starting to do their part in supporting electronic commerce, and this is set to continue with their release of Internet trading applications.

Essentially, future development of accounting software will focus on the capture of data at the source of transaction, reducing the need for data handling and manual data entry. While large and expensive accounting packages aimed at large businesses with high turnover already successfully achieve this, this technology will become available to small business at an affordable price.

Jason Daniels is an accountant with Coopers & Lybrand in Brisbane.

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Are games the only things that interest kids about PCs? **Toni Downes**

Beyond gaming

In two earlier issues I provided evidence that most children who use the computer do so for more than game-playing. Some parents may find this difficult to believe, as the response to their often asked question 'What did you do on the computer today?' usually gets the response 'I played games'. In my study of over 400 children I found that most children engaged in a wide range of leisure and educational activities on the computer in their homes. However, they often described these other activities using terms like 'play' and 'game'.

One younger child described his activity: "I can play Paintbrush and print my favourite pictures"; another said, "I print out my fairy games. I can print every game what's on the computer". For another child this language carried over to his use of electronic stories: "I play books." Even older children used this language: "I like playing Kid Pix and Magic School Bus", and "There's games like Encarta".

For some children, mainly girls, this extended into the area of playing with what they created on the computer: "Well, sometimes I just sit at the computer and I like designing my own flags, like the Aboriginal flag, and doing different sorts of backgrounds". Others emphasised that they created patterns and pictures 'just for fun'. Some children spoke of this type of environment as one where they could do 'silly' things or where they could 'go crazy'. A child explained: "Well . . . you just draw something really weird or something . . . You can put it somewhere or change it or leave things . . . You can jumble it up or something, and if you don't like it you can rub it all out."

Other children referred to 'playing' when they were using information sources as a leisure activity. "Well, we got this atlas. And I like playing with it . . . you pick your countries. And you bring it up and they show you the flag and you can play the anthem." In many ways it was enjoyment that created this sense of play. An adult in Stage 3 of my study also alluded to this notion of play and pleasure when describing her work as a graphic

artist: "Sometimes I enjoy what I'm doing so much that it might as well be play." It is probably this link between play and enjoyment that allows many children to describe what can often be serious and goal-oriented computer tasks as playing.

As well, the children often spent time 'playing with' software with no set task in mind. Much of the time this was learning time; learning about the computer, the



software or the information contained in the software in an enjoyable way. Both younger and older children described such episodes of playing with, fiddling with or exploring the features and functions of software such as paint and draw programs, word processors, desktop publishing software, sound and image manipulation software, and their CD-ROM information sources. Not surprisingly, those with Internet access extended this playful use to 'surfing the Internet'.

For the older children this type of 'playful' use was complemented by purposeful tasks related to school or homework. Mostly children used the computer for 'looking up' information, 'finding things out', 'writing things up', and decorating their writing. Again, the children's language was interesting; many children used the term 'typing' interchangeably with 'writing' or 'word processing'.

These more common activities can basi-

cally be grouped into two tasks: 'looking up information' and 'presenting information'. More often than not they were related to that universally popular primary school homework: the project. For most, doing a project involved moving back and forwards between screen and paper. Some children reported using paper-based sources of information: "First I get the information out of a book, write it on a piece of paper, type it out on the computer, and then print it out. I stick it on cardboard to hand it in to the teacher."

Other children began with an electronic source but completed the project by hand: "I get information from the CD-ROM and type up the information and print it and then put it in my own words."

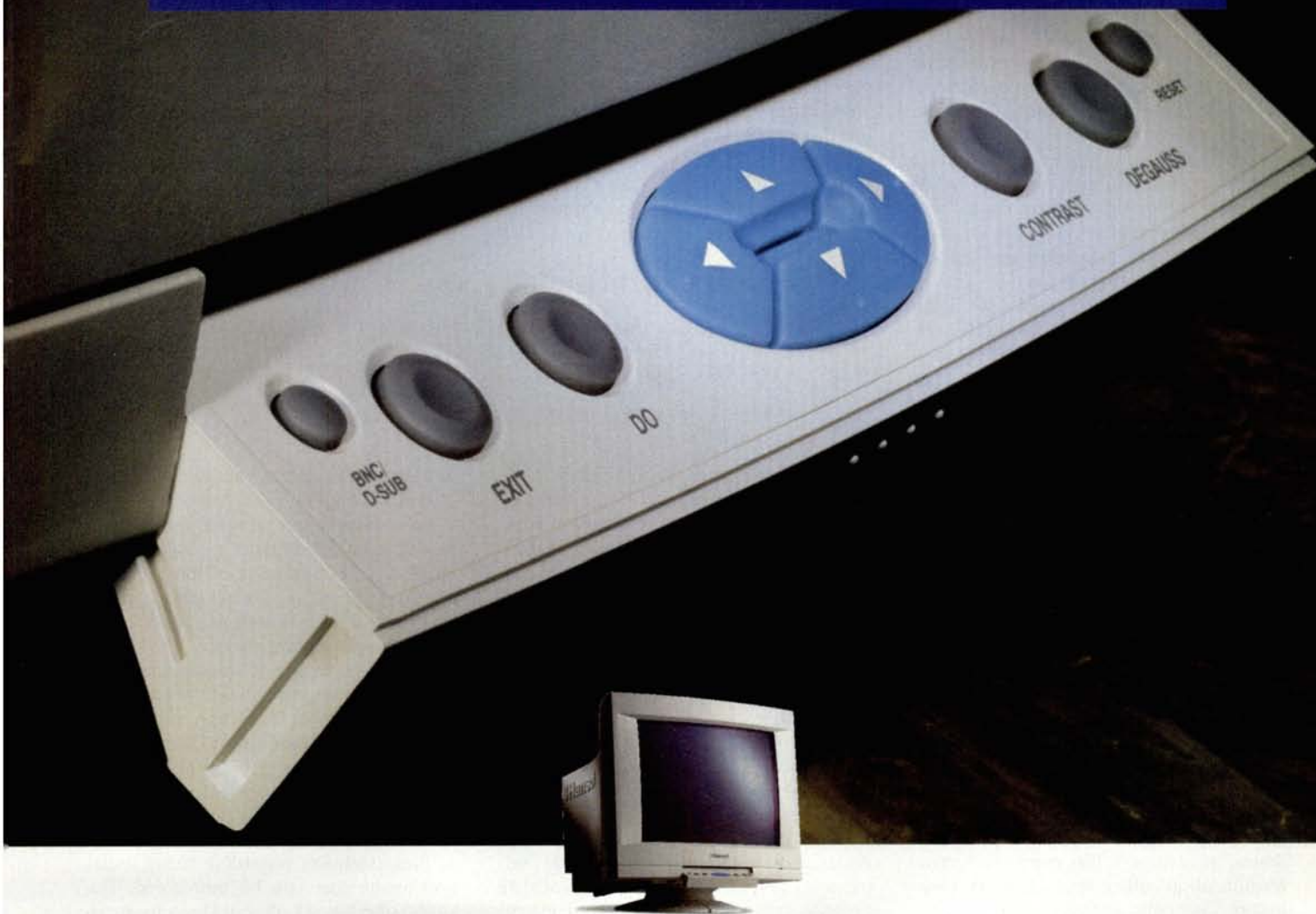
Some others read from an electronic source then organised the information on paper, before returning to the computer. "First I go to Encarta, print out the information, read it, put it into my own words, shorten it from six pages to three pages, type it into different paragraphs, print it out, print pictures through the large screen and then put [in a] colour cartridge to print [the pictures] in colour."

Very few children described a process of working with an electronic text the whole time, for instance copying the text from an electronic source straight into a word processor. Of these children some read, reorganised and wrote in their own words, and others used the original words but modified sentences and paragraphs to meet set criteria. Interestingly, the phrase 'write in your own words' was commonly used. However, few children raised the issue of copyright of the images or words that they used (from either paper-based or electronic sources).

Overall the children demonstrated that they were able to use the computer both for work and play. However, the frequent use of the term 'play' with all its meanings somewhat disguised this. The analysis of how children collected and presented information puts paid, once again to popular myths about children's use of computers: they are not a generation of mindless 'copy and pasters'.

Toni Downes is Associate Dean of the Faculty of Education at the University of Western Sydney, Macarthur.

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We are well aware of outside air pollutants, but how healthy is the air indoors? **By Selina Mitchell**

Breathing space

A breath of fresh air is getting harder to find, outside or inside. The majority of research into air pollution has concentrated on the outdoor variety; however, most of a person's time is spent indoors, and there is often a higher concentration of the pollutants found outdoors inside our home and work environments. New technologies that may make the situation worse are becoming increasingly concentrated in these environments.

For example, office furniture often emits formaldehyde at quite high levels and laser printers can emit high levels of ozone, said Stephen Brown, principal research scientist for air quality, environment assessment and chemistry at the CSIRO's division of Building, Construction and Engineering. There is also a connection between people working near photocopiers and illness, he said.

Brown has conducted preliminary research on laser printers and emission rates. He found that ozone emissions were a problem with older printers, but this could be related to deterioration or a change in production. The printers will be retested for emissions when they are six to eight months old to check for changes. Tests on photocopiers will start shortly.

"We are trying to raise awareness of the dangers and levels of emissions, and get industry involved so they can characterise products and get the levels of emissions down," said Brown. "We need more information about office environments, computers, lasers and so on."

There are specified safe limits for emissions, and it is a matter of ensuring that manufacturers meet those requirements, said Brown. He would like to develop a procedure that would enable consumers to compare products based on emission levels.

All parties (including product manufacturers) are facing an increased demand for reduced indoor air pollution and growing support for environmental management systems and product stewardship, said Brown. Legal challenges for compensation are on the increase, he added.

Poor indoor air quality is widely regarded as a significant health, environment and economic problem, and it is acknowledged that inhalation of indoor air is the major determinant of human expo-

sure to many pollutants, said Brown in his recent study on the subject. It found that the effects on health from inhaling airborne chemicals in Australia's homes and offices were costing the nation up to \$12 billion in lost productivity and sickness annually.

The State of the Environment Australia technical report, *Indoor Air Quality*, by Brown, notes that building-related illnesses, often broadly referred to as Sick

cleaners to timber stains and coatings. Symptoms of high concentrations of VOCs include irritation of the eyes, nose and throat, nausea and headaches. Some could also be carcinogenic or aggravate allergies.

Ventilation can also greatly affect indoor air quality. "Improved ventilation methods and codes are being introduced in other countries. Adoption in Australia has been slow due to inadequate research

The effects on health from inhaling airborne chemicals in Australia's homes and offices cost the nation up to \$12 billion in lost productivity and sickness annually.

Building Syndrome, can be linked to the office air environment. Predominantly subjective symptoms such as mild irritation of the nose, eyes and throat, headaches and lethargy are often cited.

The report provides a summary of pollutants, their major sources and current response measures. "In general, it is considered that many of these pollutants have not been sufficiently researched to determine both exposure levels for the Australian population and the most appropriate strategies to reduce exposure," it said.

Among the most significant pollutants listed in the report were cigarette smoke, house dust mites, nitrogen dioxide, respirable suspended particles, volatile organic compounds (VOCs) and microbials. In Australia, formaldehyde was particularly noted.

VOCs generally originate from the solvents used in product manufacture or operation. Concentrations of these substances are often higher in new buildings, where more plastics are used. Building materials and consumer products can be significant sources. While an indoor air total VOC goal has been set, the levels in most buildings are not often tested, said Brown in another report, *Assessment and Control of Volatile Organic Compounds and House Dust Mites in Australian Buildings*.

Office technology products are not the only sources of VOCs; the compounds can be found in everything from household

funding and expertise in the industry," said Brown in *Indoor Air Quality*.

Several suggestions were made for a reduction in the emissions, including the industrial development of low-emission interior products to control indoor concentrations of formaldehyde and other volatile organic compounds.

At the CSIRO, Brown's research involves the measurement of and advice on indoor air quality as well as testing of emission levels for specific products. Tests can be done to determine if air quality meets National Health and Medical Research Council guidelines. Most analysis concentrates on VOCs, but other substances such as formaldehyde, respirable fibres, mites and ozone can also be monitored. The CSIRO also has a National Dynamic Environment Chamber Facility to measure and identify product emissions.■

● It has been reported that a group of people with cancer, and the families of another group who died from cancer, are in the process of suing IBM in the US, alleging that its plant in California exposed workers to dangerous levels of carcinogenic chemicals. Several other companies that make the chemicals supplied to IBM were also named in the suit. It is alleged that IBM "willfully and recklessly" ignored health concerns about chemicals used in its plant clean rooms.

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APC-6

APC's guide to IT security for a networked new millennium. **BY SIMON VANDORE**

Security 2000

Whether you're putting a corporation on the Internet or playing online games at home, security demands attention. From Windows 95 to industrial-strength Unix, the risks are always changing and you can never be too sure . . .

In the networked world of the late 1990s, public awareness of computer security issues is at an all-time high. Scare stories abound, high-profile Internet hacks are now big stories on the evening television news, and a recent Ernst & Young survey found that 77% of Australian businesses felt their IT security risks had grown in the last two years.

But what's really needed is practical advice. What should you do in 1998 to protect your corporate desktops, servers and networks? What should individuals do? How can you balance the benefits of global internetworking with the safety of your data?

Despite appearances, security experts and consultants differ on whether the atmosphere has really changed. According to Stephen Frede, one of Australia's foremost security experts and a senior consultant with Softway, while the fundamentals

of computer security have remained the same, the balance has shifted.

"There's a lot more emphasis these days on attack from outside, and I guess because people are relying a lot more on things like commerce over public networks, then yes, there are some new issues."

But despite the number of organisations now linking their internal networks to the Internet, Frede said the majority of attacks which cause actual harm to a company are still internal, and come "from employees and contractors, or from people with a close association with that organisation". Often these are people who have simply found a loophole and don't intend to cause any damage, but end up committing fraud just to see if it is possible. There are relatively few incidents of employees actually being malicious.

Eric Halil, technical manager at AUSCERT (the Australian Computer Emergency Response Team), which responds to data security threats in Australia, believes the number of security breaches is increasing in proportion to the Internet's growth, and attacks are becoming more complex.

"Incidents have also been growing in sophistication," he said. "There is clear evidence that intruders are now examining source code and protocols, looking for weaknesses that can be exploited . . . One of the major strengths of the Internet is that it allows widespread dissemination of information — [but there is] a willingness to use that information against unprotected targets."

"If an organisation's data is worth enough, there is always a risk that it will be stolen, whether it is physically taken from the company safe, or through a network connection via the Internet. Don't forget that information can be carried on floppy, tape, paper, or fax as well," Halil said.

Internet Week reported in March that losses by Fortune 500 companies in the US as a result of computer break-ins were higher than ever, in spite of increased spending on combating the problem. Computer crime cost the corporate world



\$US136 million last year, according to a study jointly carried out by the FBI and the Computer Security Institute — an increase of 36% on the previous year. The Internet has been targeted as a point of entry for these attacks on corporate data, an International Computer Security Association spokesperson has told *Internet Week*, and reported data losses may only be the tip of the iceberg. Undetected break-ins and imperceptible data losses may represent a far greater proportion of the total problem, but go undocumented because they are invisible.

Perhaps the most striking thing about raised awareness of computer security is the number of high-profile organisations which are being hacked — whether it's the Pentagon or a multinational company, each seems to take a public beating before learning its lesson. It is a commonly held belief that there's no such thing as 100% security, but surely such high-profile sites could do better?

"The Internet provided a totally new area of exposure they hadn't dealt with before," Halil said. "Often the organisation only had what it considered public information on its site, and therefore didn't see the need for extensive security. However, it didn't factor the loss of reputation and customer trust — which is often neglected — into its risk analysis."

On the other hand, according to Tim Hudson, consultant with CryptSoft and one of the Queenslanders behind the Mozilla Crypto Group (which has made it possible to put 128-bit security back into Netscape's international versions, exported under US cryptography laws with only 40-bit capability), not every high-profile hack reported should be taken at face value. It's not unusual to place a 'sacrificial lamb' system outside a firewall to act as the obvious target for attacks: "Often this is all that has been 'hacked', and that is of zero significance in terms of the security of the company or government department being compromised — because it hasn't," Hudson said.

Nevertheless, most security consultants claim that they've never found a site of any size that didn't have its problems — often, even if core system security is watertight, a problem may exist with physical security, or a sub-branch of the organisation that has offices elsewhere. And even if you're a high-profile organisation, Murphy's Law still applies — what can go wrong will go wrong, especially on the one day you leave the door slightly ajar.

Implement a policy

The best thing you can do to reduce problems is implement a properly designed security policy, covering everything from the front door of the building to the software running your firewall.



Softway consultant Stephen Frede says the fundamentals of computer security are the same as ever.

AUSCERT recommends that such procedures have the backing of high-level management and are scheduled for regular review to accommodate future developments and respond to risk assessments. What is considered secure now may not be sufficient in a few months. And you must stick with what you decide; in April, a survey of IT executives by US company NetVersant Technologies found that 82% reported little or no compliance with company security policy in their organisation.

"Most people know that such things should exist," warns Frede, "but very few people have them, because it's not an organisation's core business to do that... Data is becoming more and more important to organisations but they're still not placing the importance on security until they get burned."

"Quality programs took a long time for people to adopt, but I think now most large organisations have a quality program in place. A good security program should be a part of an organisation's quality strategy — security is part of ensuring that you have a consistent and reliable product."

Staff should receive training in what the security policy requires. John Palfreyman, general manager of cryptography and ecommerce specialist Security Domain, said that no matter what else you do, employee awareness is the bottom line: "It amazes me to hear how many

people will send pending contracts as email attachments!"

The security policy must "permeate" an organisation, Halil said. "Until management recognises the need for security, problems will continue to plague the organisation."

A critical part of any security policy is to ensure the latest patches are installed for both operating systems and software. Many Internet security breaches are the result of hackers using holes that have been identified for quite a while.

Frede again: "Very few sites keep up-to-date with the latest patches. I'd hesitate to blame system administrators — usually system administrators are pushed to the point where they're fighting fires and being given all sorts of things that they need to do, and applying a patch is a

bit of a low-priority thing. That's where a security policy can really help, because if it's part of your policy and the CEO has signed off on it and said 'Yes, the latest patches must be applied by a certain time after their release', then it's part of your job — you can point to that and say 'I've got to do this first'."

Management must be warned in advance that while backing security may initially seem an obvious and sensible move, there can be conflicts of interest — Hudson pointed to the sacrifices involved in exercising due caution.

"The pressures for making information available and being responsive are at the moment outweighing a more cautious approach to security. I know of a number of sites where the management decision was to get online and security was a secondary issue. There is always a trade-off between usability and security. A system locked in a bank vault with no external access and armed guards outside is probably a very secure system — but it fails to be a usable [one]. Balancing this trade-off is one of the many challenges facing today's security professionals on a daily basis."

"I've personally seen managers demand that [systems administrators] open up the firewall by removing filtering rules, for an 'important demo' — and that does put a sysadmin in a rather awkward position in the absence of a clear security policy."



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OK, but what's going on here? It sounds like software is causing much of the trouble. Applying patches becomes such a chore — why can't software developers just get it right first time through their own quality control methods?

This is a contentious issue. According to AUSCERT's Halil, as with year 2000 problems in software, security can be improved if customers let software companies know it will be a determining factor in their purchasing decisions.

"[Vulnerabilities] will continue to occur until the majority of customers start demanding security as an essential part of their hardware or software," he said. "They don't ask for security, so vendors don't supply it."

Palfreyman believes it's vital that organisations themselves take the initiative, implementing cryptography and better policies. "We have to move forward in the technology rather than just relying on what the likes of Microsoft put in their products."

Bugs are probably inevitable, thanks to human nature, and to the fact that chasing them during development is often about as much fun as writing machine code in reverse.

"People who know how to write decent software have known about all the problems which have been causing these bugs for a long, long time," Frede believes. "But they still hire people who are straight out of school to turn the handle and generate the code — and they end up with all sorts of holes."

Tales from the crypto

The hottest topic in security today is public key cryptography. Its inventors and protagonists are online legends spoken about in hushed tones on Usenet. Cryp-

tography is never far from controversy, though it's never far from the establishment either. Individuals, governments, military forces and businesses around the world increasingly rely on it to secure information and transactions, yet because it is also a valued tool of hackers and even organised crime, governments often try to restrict its use.

"Technology offers the same threats [as] it offers fixes," opined CryptoSoft's Hudson. "As we deploy security to remove threats, others will deploy security to hide their own efforts."

The enthusiast's challenge of the moment on the Internet is to crack 64-bit RC5 (RSA) key cryptography — RSA has issued an online challenge and you can see the progress of those who responded at <http://www.distributed.net/rc5>. Considering it took nearly a year to crack 56-bit the first time, be surprised if you hear of a result any time soon.

Cryptography's decaying baseline is currently the 40-bit key, now considered less than secure. In 1996, the Business Software Alliance estimated that a casual hacker with a \$US400 budget required five hours to crack a 40-bit DES (US government approved) encryption, whereas it would take the same person 38 years to crack 56-bit. A corporate IT department with a \$US300,000 budget could crack 40-bit in just 24 seconds and 56-bit in 19 days. Up in the big league, a \$US300-million intelligence agency would require just 0.0002 seconds for 40-bit and a full 12 seconds to cope with 56-bit.

Not satisfied with either? The sky's the limit — 512 and 1,024-bit encryption is now being used in digital certificates, the future tools of electronic commerce. When you take into account that 40 to 41-bit is a doubling of security, 41 to 42 is a doubling again, and so on, 1,024-bit key cryptography is not for the faint-hearted.

Frede said he doubted that even 128-bit crypto would be threatened in the near future, as processing power only doubles every 18 months or so. Palfreyman agreed, putting 128-bit into the category of "computationally infeasible". Key cryptography is perhaps the most powerful security tool available today.

Sympathy for the devil

While everyone to whom APC spoke had praise for SATAN — the initially controversial (and now out-of-date) security scanning tool released in 1995 by US security expert (and leather-clad biker) Dan Farmer — few believed it was a good idea to use actual hackers, rather than software simulations, to work out a defence.

If you were hiring an accountant, would you look for someone who had defrauded a dozen companies? Of course not, said Frede. Then why do people continue to think that 'penetration testing' performed by a hacker can find all the holes in their system? AUSCERT advised that such a person is "unlikely to encompass the skills needed to secure an entire organisation".

"I firmly believe that security through obscurity or ignorance is worse than no security at all," said Hudson. "A tool can be used for good or bad purposes and this isn't the fault of the tool itself... [But] it has to be noted that if somebody can't demonstrate an ability to be respectful of the integrity of other people's property in all its forms, they fail to show social skills which are very important."

"[As] a security consultant," said Frede, "you need to make sure not only that the external parameter of security is valid — which is often all the attacker sees; you also need to make sure that there are a



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NT security: Start here

With the increasing use of NT for both internal and external servers, security is becoming a major focus. But how can it be implemented swiftly, effectively and silently?

Firstly, as an administrator you should modify your system to protect your users from themselves. This can be done through the User Manager application, where your first task should be to change the settings for the 'built-in' users.

The Administrator account: The best way to secure this account is to duplicate it to another account, then remove the permissions from the built-in one. Additionally, you can restrict the hours that the built-in administrator may use the system to zero (by highlighting it, and disallowing all logons).

An additional benefit of this is that anyone who tries to finger the administrator, or indeed run `nbstat`, will see the account still exists, yet their login is disabled by default. And the Event Log will keep records of unauthorised log-in attempts, so you can take further action if needed.

The Guest account: The guest account should be removed and replaced with separate, temporary user accounts that can be enabled or disabled when required.

System policies

Default system policies should be enabled to protect various areas of the system from access. It is usually best to have a set 'minimalist' configuration for both Default Computer and Default User, and then have separate policies for each user on the system. Following is a rundown of the most important user and computer policies.

NT System, Logon, Do not display last logged on user name: Clear the username box on the log-on screen each time a user logs in.

NT System, Logon, Run login scripts synchronously: Does not allow users to log in until all specified start-up scripts have completed.

NT Network, Sharing, Create hidden drive shares: Does not allow users on the local machine to make \$ hidden shares on the machine. (\$) indicates the share can be mapped via the map network drive — right-click on Network Neighbourhood — but not from the network browser.)

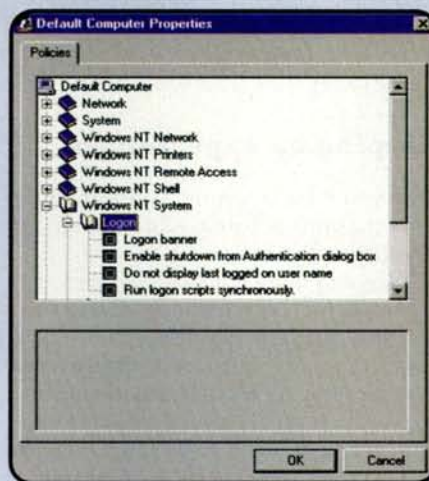
NT Shell, Restrictions, Use approved shell extensions: Does not allow users to install their own INF scripts,

or alter main NT shell components (such as downloaded IE4 shell extensions).

Device audits

Security Audits are an important way of determining how your system is being used and perhaps compromised. To make sure you are being fully informed about your system, it is necessary to enable both Domain Auditing and File (directory) audits. The former should have all results (success and failure) monitored for best security, while you should apply the latter to:

- C:\
- C:\WINNT
- C:\WINNT\System32
- C:\WINNT\Repair
- C:\WINNT\Profiles (with subdirectory trees)
- C:\MSOffice (if installed)



Remote access and the Internet

If your business has an intranet/Internet/extranet presence, the next area of system control is TCP/IP traffic on your network. The following guidelines should be followed in order to secure your IP connections.

Only assign needed RAS traffic: The User Manager should be checked at regular intervals for any outstanding RAS permissions. The easiest way of keeping RAS priorities in order is to create an NT user group called 'RAS Users' and move all users who need dial-in permissions from other groups into this group. You can then proceed to grant access to only the RAS group.

Log all RAS traffic: Ensure logging of all traffic is enabled on your server by modifying the registry key as follows:

HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services\RasMan\Parameters\Logging. Change the REG_DWORD entry for this key to 1. Then simply enable 'Record a Log File' in your Control Panel, Modems preferences.

Disable NetBIOS over TCP: These bindings can leave networks vulnerable to attackers who view `nbstat` readings from remote computers. Therefore they should be disabled whenever possible, especially on NICs that are positioned to work directly with the Internet.

Block non-essential TCP/UDP ports: Using the Security Control in Control Panel, Network, TCP/IP, you can 'Permit All' or 'Permit Only' TCP and UDP ports (and IP protocols, if desired). This control should be set up to allow access only on ports from which access is required. UDP ports 137 and 138 and TCP port 139 are prime examples of ports that should be disabled to prevent attack.

Simple TCP/IP services are to be avoided, as is a pre-SP3 TCP/IP printing service — because both mechanisms can be compromised and access can be granted by a spoofing attack. If you are unable to install Service Pack 3, you should either disable these services or invest in another type of printing device.

OOB fix: The Out of Band (OOB) bug doesn't only affect NT servers and workstations, but certain routers as well. OOB is an important fix to assist in the elimination of Denial of Service attacks, both internally and externally.

Proxy traffic where possible: The best way to prevent attacks directly from the Internet is forcing NT to proxy traffic information and disable local ports. It is feasible under NT to proxy all outbound Internet transmissions through port 80 and 8080 (HTTP and secure HTTP) and then disable port 21 (standard FTP) and 23 (standard telnet) — thus removing the possibility of having rogue outbound servers operating on the network.

Remote administration: VNC (Virtual Network Computing) is a program which makes access far easier for administrators. VNC is available for Win32 and Unix variants (<http://www.ori.co.uk/vnc>). It allows an administrator to control machines on the LAN via TCP/IP addresses and is outstanding for coping with large volumes of server-based administration.

Paul Drain

Unix security: The real issues

While Unix provides some inherent security mechanisms, it was not originally designed to be secure, and its open model is often at odds with efforts to implement security.

Here are the major issues relating to Unix security and practical steps that can be taken to address them.

Guidelines

Physical security: Attacks via physical access to a system are usually trivial. While cursory measures such as implementing BIOS security may deter casual intruders, the physical environment in which the system operates should be adequately secured.

Operating system: Outdated versions of operating systems are often easy targets for attackers. Ensure that the latest stable release of the operating system is installed along with any subsequent security patches.

Services: Unix systems are typically

installed with a wide variety of services enabled by default, some of which may be unnecessary for the operation of the system and could become targets for exploitation at a later stage. It is prudent to disable unnecessary services, although this should only be done if the implications of doing this for specific services are understood.

Applications: Many applications are poorly written from a security point of view and can jeopardise the entire system if given privileges or executed by a privileged user. In an unprivileged context, they may also compromise the privacy of general users. Measures which can increase application security include:

- ensuring that the latest version is installed, along with any security patches;
- reading all the documentation relating to installation and configuration;
- inspecting the code of the application (if available), looking for potential security issues.

A useful guide to secure application

development is located at [ftp://ftp.auscert.org.au/pub/auscert/papers/secure_programming_checklist](http://ftp.auscert.org.au/pub/auscert/papers/secure_programming_checklist).

Passwords: Passwords which are easily guessable or composed of simple permutations of words and numbers are a significant security risk. Ensure that passwords are at least six characters long, and are composed of a combination of letters (both cases) and numbers. Useful measures for enforcing password security include the use of pro-active password checking systems during password selection, and running programs such as Crack over password files to weed out bad passwords.

Modems: Modems are problematic on Unix systems as they provide paths in and out of the system that can easily be overlooked and misconfigured. Measures that can be taken to increase modem security include:

- assuming that not only authorised users will know the telephone number of the modem;

number of different layers in place so that if the external parameter is breached . . . the next level in is going to protect you. You need to look at all those things and you can only do that from looking on the inside. You also don't have unlimited amounts of time. [The] customer is paying you money and they expect to get results, and you can't say to them 'It'll cost you my time for the next six months and then I'll come back to you with a result — I'll have broken into your system'. They want realistic time frames and realistic levels of payment."

If penetration testing works, one way into the system is found. If it doesn't, nothing has been proven.

Keeping up appearances

Once you have a security policy in place and your staff are being trained, turn your attention to the news.

"Keeping up-to-date includes performing regular security audits, going to conferences, reading journals, monitoring Internet resources such as Web pages and mailing lists of trusted organisations, reviewing business practices, and constantly educating and re-educating all staff on their responsibilities to security," said AUSCERT's Halil.

AUSCERT itself runs an archive of alerts (see <http://www.auscert.org.au>), though the main international source is the CERT

list originating in the US (<http://www.cert.org>). By subscribing to CERT you will receive the latest advisories, with recommendations on how to remedy problems.

There's also SAGE-AU, the System Administrator's Guild of Australia, (<http://www.sage-au.org.au>), which also keeps its members up-to-date on security and offers assistance in difficult situations.

Ahh, so now you're excited by all these tips? Looking forward to that sensual new security policy? Well, not exactly . . .

According to Frede, "Security is not and should not be sexy. Security should be about as sexy as accounting . . . and as important." ■



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- restricting who may log into the system via the modem line;
- utilising callback and line identification features where available;
- ensuring that modem device permissions are correct;
- correctly configuring privileged modem software (or removing its privileges);
- having the communications carrier restrict classes of outgoing calls on modem lines where appropriate.

Network access: A popular telnet replacement is SSH (Secure Shell), which uses public key cryptography to set up an encrypted session. SSH may also be used to forward other types of TCP connections over the network and needs to be configured carefully.

Other methods of remotely working with Unix systems — such as rlogin, rsh and rcp — may be difficult to secure effectively. SSH is also intended as a replacement for these applications. SSH may be found at <http://www.cs.hut.fi/ssh>.

Web servers: Web servers are commonly deployed under Unix for Internet and intranet purposes, and often deliver active content in the form of search engines, database interfaces and other applications.

A significant security issue exists in the code used to provide active content, typically CGI scripts, which should be reviewed for potential security problems. Many successful site break-ins have originated with the exploitation of sample CGI scripts, some of which are still lying around on many older Web servers.

It is also important to keep up with the latest versions of Web servers, and sites running freeware software should consider installing the latest Apache server.

A good source of information on CGI and general Web server security may be found at <http://www.w3.org/Security/faq/www-security-faq.html>.

Security tools: A wide variety of security

tools are available which may be used to implement specific security measures such as checking the system for configuration problems, verifying the integrity of applications and data, and scanning log files for suspicious events. Following is a selection of useful security tools:

- Cops: System configuration checking tool (<ftp://info.cert.org/pub/tools/cops>);
- SATAN: A network scanning tool, useful for detecting problems within a network (<ftp://ftp.win.tue.nl/pub/security/satan-1.1.1.tar.Z>);
- Tripwire: A system integrity verification tool (<ftp://coast.cs.purdue.edu/pub/COAST/Tripwire/>);
- Logsurfer: A flexible system log file analyser (<ftp://ftp.cert.dfn.de/pub/tools/audit/logsurfer>);
- LSOF: A useful tool for reporting information about processes using files and network services (<ftp://coast.cs.purdue.edu/pub/tools/unix/lsof>).

James Morris

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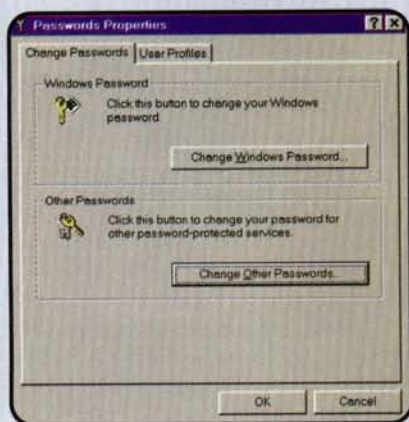
Security on the desktop

Windows 95

Windows 95/98 doesn't even pretend to be a secure OS — hit Esc at a user log-in box and you can still access anything on the PC that isn't encrypted. Even a DOS boot disk will suffice if there's no BIOS password implemented.

But on a network with good password policies, a Windows 95 client is as safe or unsafe as anything else. You can even use it as a low-volume, low-budget server platform (check <http://cws.internet.com> for server software); but with the serving advantages and greater stability of other operating systems, this is not always a wise move. On the other hand, it's convenient to leave a secure Windows 95 FTP server like WFTPD running on your home PC so you can transfer files to and from work at any time.

Internet connectivity under Windows 95 can introduce a few security liabilities, usually involving third-party applications like Web browsers. These mostly involve Denial of Service attacks that crash or slow your PC, rather than actual break-ins.



Make sure to apply the latest patches for each application (<http://www.winfiles.com> is a good place to look for these) and either upgrade to Windows 98 or install Microsoft's Windows 95 Service Pack 1, Dial-up Networking Version 1.2 and Windows Sockets 2.

If file and printer sharing is turned on, administrators must ensure that permissions are set properly — allowing individual users to do this is both a convenience and a liability. Sharing files through network server directories provided by the administrator is a better option.

It is possible to make Windows 95 much more secure — even approaching NT levels

— by adding a third-party security suite. One of the most impressive packages is Norman Data Defense Systems' Access Control, which adds true password protection, hard disk encryption and user access levels like those found in Windows NT.

There are several other Windows 95 security products, often aimed at different market sectors, such as Cybermedia's Guard Dog Deluxe (a consumer-level product for Internet users) and McAfee's VirusScan Security Suite (which includes PCFirewall and PCCrypto applications).

Simon Vandore

Mac OS

The Macintosh has the reputation of being the most secure platform for Web servers. The main advantage is that although TCP/IP has been part of the system software for years, there are no built-in TCP/IP processes for intruders to attack. Hosting different services (HTTP, FTP) on separate systems — or at least ensuring there is no overlap in the file space accessible by the various server programs — also helps.

The widely-used WebStar Web server survived at least two cracking competitions with cash prizes worth around \$15,000, although a Queenslander won a subsequent competition by identifying a hole in a third-party product.

Security flaws do come to light from time to time (often without the nature of the problem being widely disclosed), so users should actively watch for any protective updates and install them once their authenticity is confirmed.

Physical security is important. Macs are compact and easily removed — high-demand Mac sites distribute the load across multiple servers — unlike the bulky 'superservers' produced for other architectures. Servers need to be self-restarting in the event of a power failure, so it isn't practical to rely on security software that requires a password at startup.

Mac OS's File Sharing feature is often used as an adjunct to (or at smaller sites, instead of) an AppleShare server. The Guest login avoids the need for separate usernames and passwords for each node, but as some Internet server software inherits access controls from File Sharing, care should be taken to avoid giving outsiders greater access than was intended.

BetterTelnet and NCSA Telnet have an FTP server capability in addition to telnet,

which could compromise security if inadvertently or maliciously activated. If Retrospect is used to back up clients on a TCP/IP LAN that is connected to the Internet, hard-to-guess security codes must be chosen for each client to minimise the risk of them being accessed from outside, and any deactivated clients should be removed from the computers concerned to prevent them being remotely reactivated by an intruder.

Stephen Withers

OS/2 Warp

OS/2 Warp 4 itself does not ship with much in the way of security when configured to run on a single workstation — all that is included is a section called 'Security Enablement Services' (known as SES — look under Install/Remove System Components, OS/2 Setup & Installation, Optional System Components, Security).

SES provides a set of application programming interfaces (APIs) for running security applications. The applications provide enhanced file, print and process security, and are only useful to those developing their own applications. Security itself is offered by using one or more third-party utilities, and these are broken roughly into two distinct sections: workplace security and encryption.

Workplace security actually prevents access to information, and can best be characterised by file, folder and desktop locking, and password protection. One such utility is Workplace Security for OS/2 by Maple Valley Software (on this month's cover CD, see page 175). Files can be locked and unlocked with their own passwords, or a super-user password.

Encryption, on the other hand, disguises information; files are often readily available for viewing, but not understood. The encryptor can use passwords and/or keys, and the decryptor will only work if the original passwords and/or keys are supplied.

Such third-party encryption programs include PMCrypt for OS/2 by A Gawthrop (on this month's cover CD, see page 175.). Although it doesn't ship with any specific security applications, OS/2 has quite powerful security when installed as a server — much like other systems, files, folders, and so forth are protected by user names and passwording, all completely configurable by the user.

Christopher Relf

A look at the growth of Open Source and the new development paradigm it has introduced. By Nathan Taylor

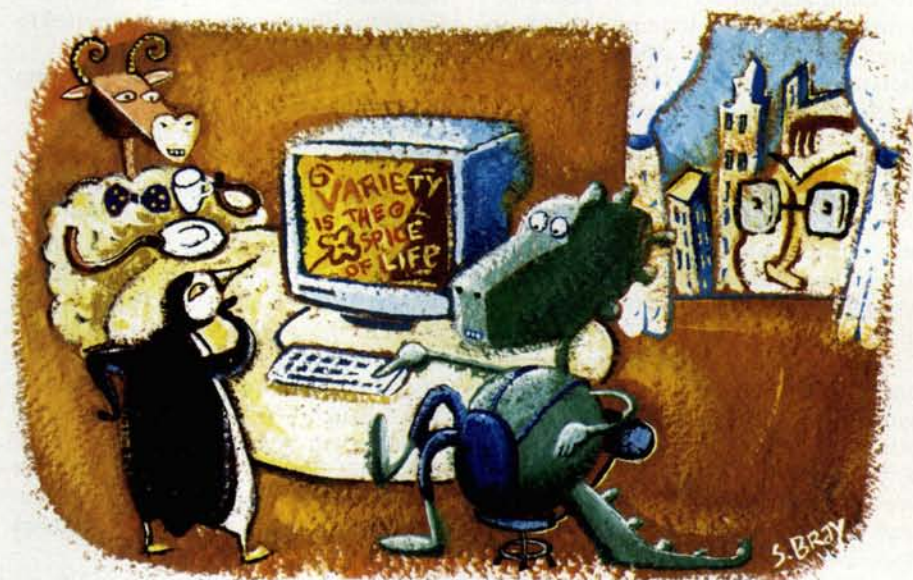
What's GNU? Free source code

Way back in 1982, an MIT hacker, Richard Stallman, began work on an interesting, but far from mainstream, project. Going by the weird recursive acronym GNU, which stands for 'GNU's Not Unix', it was a system composed entirely of 'free' software — free in both the sense that it cost nothing to buy and that the user had the right to modify and distribute the software for their own needs. The GNU system originally comprised a compiler, a text editor (Emacs), a kernel, and numerous other basic OS features, but grew to include networking support and other advanced features.

Stallman believed that software was analogous to a mathematical formula or recipe — nobody has the right to own software, just as nobody has the rights to mathematical formulas or recipes. Stallman also argued that charging people for a product with unlimited economies of scale, such as software, was ridiculous, greedy and wasteful; and that keeping source code private caused "harm to the spirit of scientific cooperation". With this ideal as a starting point, what became known as the GNU General Public License (GPL) was drafted. The GPL essentially states that any distribution of software under the licence must be accompanied by the source code, which can be freely modified by the user, and that all modifications to that source code must also be made public upon distribution.

In this way, Stallman hoped to create a kind of helix effect in the software world: anybody who hoped to build upon any GNU applications or use any GNU source code would also have to make their software open for modification and redistribution; and these in turn could be modified and distributed. This is the GNU GPL's inducement to developers. In the words of Stallman: "If you will make your software free, you can use this code."

The software itself cannot be sold, although companies are entitled to make



money for packaging and distribution, as the distributors of Linux do today. In the world of the GNU GPL, there is no such thing as per-user-licensing; there are no restrictions on what can be done to the source code; and there is no way companies can prevent people from redistributing software (thus, there is no such thing as piracy).

It's taken a long time for this ideal to permeate the rest of the industry, but now 'free' software is starting to cause some rumblings. People are beginning to realise that collaboratively produced software can be as, or more, efficient than software produced by commercial organisations. This collaboration is being achieved through the efforts of thousands of enthusiasts who, unlike commercial organisations, are not afraid to open up their source code to scrutiny, and are not that averse to accepting hints, code patches and ideas from people.

There is a growing pool of very powerful and freely available programs that have been developed this way. Linux, FreeBSD, Apache, Perl, XFree86 and Gimp are just some of the flagship products spawned by this software revolution —

products developed by the collaboration of developers from around the world communicating over the Internet. Not all of them fall under the GNU GPL, although most have similar licences.

For a long time, the Open Source effort (as it has become known) was perceived purely as the domain of a niche group of Unix hackers — the only people who could seemingly understand or take advantage of the redistribution of source code. Early this year, however, Open Source was brought into focus for the general public when Netscape announced it would distribute its immensely popular Navigator browser free, and that the source code would also be freely available, in order to take advantage of the collaborative model which produced such outstanding code as found in Linux or Apache.

Under Netscape's own public licence (the Netscape Public License, or NPL), Netscape Communicator 5.0 and subsequent versions would be developed by interested and talented programmers from around the world, instead of by a small team at Netscape.

Opening up to the possibilities

While the ideal is there, there are no hard and fast rules about how Open Source code development *must* be handled, although some models have been more successful than others.

Eric Raymond, one of Netscape's consultants for the release of the Navigator source code and a founding member of the Open Source effort, has defined two models of source development. In his paper, *The Cathedral and the Bazaar*, Raymond posits that the development model of Linux has precipitated a new realisation that, using the Internet, software could be developed by tens, hundreds, even thousands of developers.

Raymond calls this the 'Bazaar' model of source development, in which a large number of developers, each with their own agendas and interests, collaborates to develop a workable system. Previously, a system Raymond refers to as the 'Cathedral' model (where software is "built like Cathedrals, carefully crafted by individual wizards or small bands of mages working in splendid isolation") was the orthodoxy even for developers of GPL software. It was believed, claims Raymond, that this was the only workable way to produce software, and that the Bazaar model of development could not produce quality software. In an experiment to test the Bazaar model, Raymond ran a project to develop a customised mail-fetcher, one he classifies as a "significant success".

Reputedly, it was this very paper which convinced Marc Andreessen that opening up the source code of Netscape Communicator was the best thing for the product. It's really too early to judge the success of the project, but Mozilla.org — the group Netscape bankrolls and has left in charge of managing source code updates — has already reported some success, notably the release (within five days of the source code release) of Troll Tech's QtScape, based on the Navigator code and using the Qt library.

The Bazaar model seems to work best when there is a central person or group of people managing versioning and patches — keeping an 'official' version, so to speak. This ensures there is one 'best of breed' solution; that all versions of a particular application are interoperable; and that quality control is maintained.

An example of this is the Linux operating system. Linus Torvalds, the original developer of the operating system, still maintains all the official versions of the

OS, frequently releasing new development versions or stable versions of the kernel. All patches submitted by eager programmers are reviewed by Torvalds or one of his trusted lieutenants, and, if acceptable, are incorporated into the next kernel release.

FreeBSD, another free Unix variant (not under the GNU GPL like Linux, but under its own licence), is developed in a similar way to Linux — a core team of developers at Berkeley University manages and integrates the patches sent in by hundreds of other developers. The core team has set up a mailing list and FTP site for all the people who have committed to working on the popular Unix variant.

The FTP site itself is managed using another freeware application, CVS (Concurrent Version System), which is a source-code-management tool that enables management of patches and official stable and development versions. People with write access to the source tree are known within the BSD as 'committers' (a name derived from one of the functions of CVS). Other interested parties are invited to perform debugging tasks, provide feedback, and volunteer for other work as required. The FreeBSD Web site, similar to other development Web sites, contains lists of tasks that need to be done (requests for development of manuals and documentation are common on these 'volunteers needed' lists).

Version control systems, like CVS, are used extensively in this kind of collaborative project. They enable developers to record the history of source files; retrieve old versions when things start to go wrong; and, most importantly, help prevent collaborators from getting in each other's way and overwriting each other's code. CVS is not the only system out there: other systems include the Source Code Control System (SCCS), the Revision Control System (RCS), and the APL Version Control System (AVCS).

Mozilla.org works using a method similar to FreeBSD. Anybody can contribute code — just send it in and it will be reviewed, and if it is good it will be included. By and large, Mozilla.org employees do not take on the role of coders; rather, they are source-code managers, routing patches to the appropriate people, passing on bug reports, maintaining a source tree and so forth. Each chunk of the code is managed by a 'module owner', who examines patches and submits module updates to Mozilla for integration into the source tree. Mozilla.org assigns modules on merit — anybody who is good enough can be a module owner. The Netscape

Public License (NPL) enables users to put together their own distributions, so versions can be — and already have been — developed outside of Mozilla.org. (Similarly, if somebody wanted to start doing their own kernel releases for Linux, they could.) Mozilla, however, remains the primary source for most developers.

Projects without a focus team have tended to splinter in the past. When id Software released the source code of the ever-popular Doom to the public, it was done without any central management of the code — anybody could take the source and modify it as they pleased. According to id's John Carmack, management of the source code "wasn't an option" for id from a staff-resource point of view.

The lack of centralised management has led to a proliferation of enhanced versions of the 3D shooter, each with their own strengths and weaknesses. Somebody wanting to find the version that best suits them would have to download and trial the half a dozen or so different versions available. There is no 'best of breed' version in the works, but Carmack claims to be happy with the results nonetheless. "I think the multiple teams will explore different directions profitably," he said.

The good, the bad and the Bazaar

According to Raymond, development using the Bazaar model has two great advantages: one is the diverse array of ideas coming from a vast number of developers; the other is the massive amount of beta testing that is carried out. Furthermore, the beta testers often come back with a solution to problems and bugs that includes a code patch or ideas for workarounds in the source. Under the scrutiny of expert eyes, bugs can be identified and solved quickly. This also has the effect of increasing the rate of development dramatically. Not a week goes by when there is not a new Linux kernel or Gimp release.

To take advantage of this, Raymond believes several things must be done. The first is to notify the developer community of the project through newsgroups, Web pages, mail or other means. To use the Linux example again, Torvalds attracted his first developers from a Minix newsgroup (Minix is the OS Linux was originally built upon).

Secondly, Raymond believes it is important that developers "release early and often", allowing the developer community the opportunity to scrutinise and

comment on every stage of the application development. Of course, it is also important to have code that is decipherable, well commented, and preferably modular in nature — the modular nature of Gimp, for example, makes it an excellent model for distributed source development.

The other major advantage Raymond has identified is that by making the source available to scrutiny, pressure is put on developers to produce code that is clean, bug free, and well thought out. "The Open Source community's internal market in reputation exerts subtle pressure on people not to launch development efforts they're not competent to follow through on. So far this seems to have worked pretty well," states Raymond in the *Cathedral and the Bazaar*.

The Bazaar model of development is not without its problems, however. Anyone delving into the world of Linux will quickly realise that sorting out versions, extensions and add-ons can be somewhat painful at times. Only the most savvy of users can keep abreast of all the versions and changes and, like most Open Source software, Linux is very far from a stage where anyone can use it. Without the incentives of commercial development to push the

product to the largest audience, programs are often written without traditional concepts of 'user-friendliness' in mind.

Another problem can arise when a programmer loses interest in a given application — often before it is complete. Stallman, Raymond and other Open-Source disciples implore developers to hand over responsibility for a given application to another interested developer if they lose interest. Otherwise the application will stagnate.

The greatest accusation levelled at Open Source, and the reason why many companies still shy away from it, is the perceived lack of support for the products. Support systems for Open Source products are, for the most part, relatively ad hoc, although some vendors do actually make a significant proportion of their money supporting free software. Apart from this, support comes mostly from the community of users of the software. As any user of Linux would know, help for most Linux problems is rarely more than a newsgroup away, but certified and guaranteed support is not so easy to come by.

Finally, how do developers make money from free software to fund their

development efforts? Some do it by selling 'distributions' of the software — customised versions and application bundles that cater to particular markets. The best examples of these are the various customised Linux 'packages' from vendors such as Red Hat, Caldera and SUSE. These companies also make money from support services, giving companies and individuals a 'real company' to deal with when problems arise.

Hardware vendors are also inclined, on occasion, to fund development of Open Source. A notable example is the development of the free C compiler, available under the GNU licence, which was funded by Intel, Motorola, Texas Instruments and Analog Devices. The development of the X Window System by an open industry consortium has also shown that commercially-driven projects are viable.

Most Open Source development, however, still happens simply because a programmer or group of programmers has an itch they need to scratch. This, ultimately, is the very essence of the Open Source movement: people programming not for the money, but because they want to, and because they want to share it with others. ■

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Wealthy and Wired

BY JEREMY WHITE

Pundits, crackpots, hacks and flacks all hunt the elusive killer app. But all the while one of the most significant applications ever to emerge from this country's fiscal undergrowth is sitting neglected in our studies and home offices, in living room corners and spare bedrooms, pining for attention. Unfortunately, no-one in Australia seems to give a dropbear's brass razoo. The little critter's name is efinance, but instead of its name being up in lights, it's up there on the ACF's endangered species list, a testament to the short-sightedness of the finance and technology sectors in Australia.

Personal financial management is about as close to a killer application for the PC and Internet in the home as you're going to find. It's useful, it's easy if well implemented, and it offers real and tangible benefits to ordinary folk of all ilk. But few people are asking for it, and even fewer are offering.

If a business invests in technology, the justification on the Capex Request is usually to cut costs and ease administration. You're after a direct return on investment, or you wouldn't be spending the money.

For some reason, though, the same people, when buying a PC for the home, will often invest thousands of dollars, and even more time and energy, without being able to directly articulate the return on investment.

If you ask most people why they buy a computer for the family home, you'll get a weird prioritisation: playing games, educating the kids, writing letters to family and friends, and surfing the Net. Then, somewhere down the bottom of the list after 'typing the shopping list' and 'cataloguing the family history' will probably be 'doing a budget'.

Happy fact: managing your hard-earned cash is one of the simplest and most effective things you can do with your PC

and a Net connection. Sad fact: few people realise it, and fewer still actually do it.

In the US, personal finance and technology are coagulating into an explosive mix right now. Australia is at least 18 months to two years behind. But we have at least reached the point where the elements required for critical mass are starting to come together.

In this month's cover story, we look at the building blocks needed to create a PC-enabled Unified Financial Universe: personal finance software, online personal finance sites, resources and tools, electronic banking, and electronic investment. Concern about security is one of the greatest inhibitors of efinance and business accounting, and we have a related feature on this topic beginning on page 67.

Before we look at each individually, however, let's look at how they should all work together.

The efinance vision

The idea of using a PC to manage finances has always been appealing. In practice, however, for many people it involves far too much manual work to be worth the effort. To use a personal finance package like Quicken, you've always had to key in each transaction and bill, and manually reconcile these with bank and credit card statements. It's basic, old-fashioned data entry, and it takes a lot of time and discipline. Once you'd keyed in the data, you could then plan your financial future, budget your expenditure, and analyse and control your good and bad financial habits. You could also schedule bills and even print cheques.

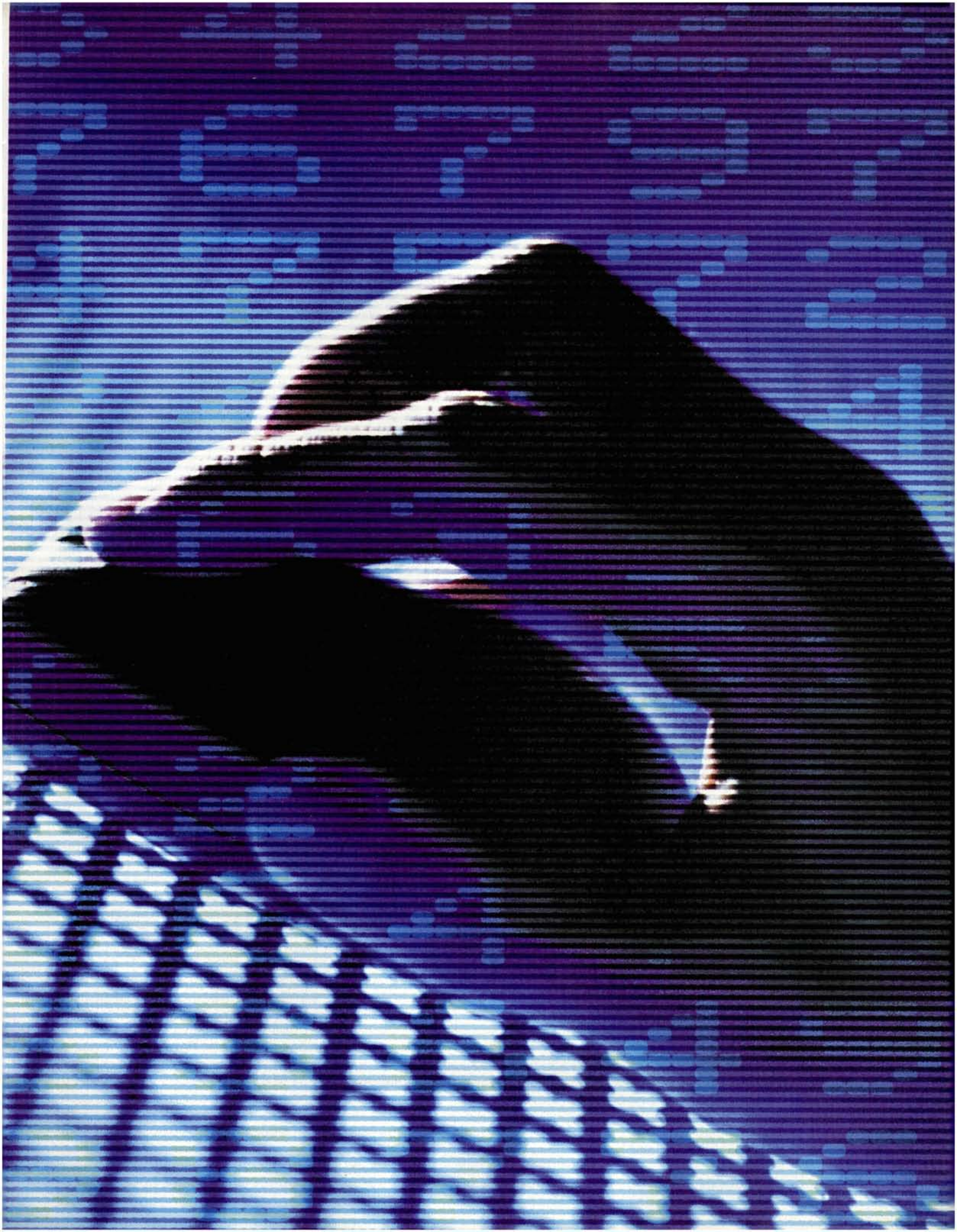
APC expects that many of its readers will have already tried to use their PC to manage their affairs, either using Excel or 1-2-3, or a package like Quicken, but not progressed much further than typing up a budget and keying in a few weeks' worth

*Pundits, crackpots, hacks and flacks
Are all out hunting the killer app.
Shopping, TV on the Net
Home delivery of pets and vets
Hubs, clubs, pub reviews
The morning paper, the evening news
But all the while he's locked at home
Our little friend, the finance gnome
With green screen glares he sits and sulks
Until the day that bandwidth bulks
And OFX does a mainstream dance,
It's dollars, dummies, efinance.*

of receipts, and then given up. The biggest obstacles to using a PC to manage financial affairs are the simple manual operations — keying in data, reconciling statements, and sending out bills.

None of these should be necessary, of course. Every time you pay for an item on a credit card, or withdraw money from an ATM, or send a cheque, that data is recorded electronically at some stage. With EFTPOS and credit card transactions, more often than not the entire process is electronic. The details for your accounts are all sitting in databases, and most businesses with which you deal use computers, and are either cross-connected to financial institutions via EDI, or use their own electronic accounting and billing systems. To have to rekey all this data is just plain unnecessary. It's pure waste, duplication, and inefficiency on a massive scale. Everyone just accepts this as being naturally the way things are. But they don't need to be, and the situation is finally changing.

In the US, using either Quicken or Money, you can not only download statements from your choice of around 100 banks each, but you can also actually use your personal finance software package as a 'front end' for doing your banking. You manage your accounts over the Internet using your package of choice, and



your statements are effectively reconciled live. If you schedule standard payments or bills in, say, Quicken, the payments are actually dispatched electronically.

This enables a massive change. No longer does the effort of managing your finances involve the physical logistics of keying in transactions from receipts and statements, and remembering to write and post cheques when they're due. Your PC is now able to handle all this data for you, and you're free to actually use the analysis and management tools these packages offer to get your financial house in order.

Better still, you can finally use your PC to automate the process. Rather than going through the rigmarole of setting up program payments directly with your bank, you can set them up yourself, and vary them directly from your PC. You tell your PC when bills are due and it pays them.

With ecommerce, all this becomes more exciting still. You can use your PC to manage the process of acquiring your goods and services from your PC (what one speaker from the floor at the recent WWW7 conference termed 'not shopping'), and control that process from your financial management software.

Investment is another area with huge potential for integration. With a large range of options for electronic investment and trading appearing, as well as planning your investments using your PC, you can actually manage the transactions and the portfolio directly.

You're also freed up to think about long-term planning and growth. To help you understand how to approach this, finance packages have always offered fairly comprehensive tutorials and help. They're now taking the next step, acting as front ends not just to the transactions and data, but actually integrating their analysis tools with advice. This means that if your level of debt is too high, your finance package will not only let you know that, but give you a plan for reducing it.

Furthermore, these packages are starting to act as front ends to financial news and resources of a more general nature. Quicken offers Quicken.com, and Money offers MoneyInsider. But as you'll see, there are hosts of other sites. These provide updated news and advice articles, as well as stock quotes, book reviews and all kinds of other resources. They're almost like living books, in the sense that they offer structured, detailed advice that is updated with changes in the market.

The next step is to integrate this 'live

advice' concept with the wizards and guides built into the packages. Then they may not only tell you that you have too much debt and offer a reduction plan, but also tell you who has the cheapest rates to refinance, and perhaps manage, the application for you.

This isn't as far-fetched as it sounds. Most larger financial institutions have moved onto the Internet, and are actually opening up their processes to the Web. Once everyone uses the same technological infrastructure, the Net, and agrees on a common method of exchanging information, such as OFX (Open Financial Exchange), proposed by Microsoft and Intuit et al, the next obstacles are political rather than technological.

Unfortunately, or maybe fortunately, banks and other financial institutions have a vested interest in not letting other parties — such as software companies — come between them and their customers. A Commonwealth Bank (CBA) is right to have a healthy concern about its customers coming to it through a Microsoft finance program. And this is one of the reasons that the Australian market is so far behind the US.

Even if your bank is online (if you are a Advance/St George or CBA customer), and even if you can download your account statements to Excel or Quicken, integrating that data into your finance program is still a manual process because in Australia there are not the kinds of partnerships you see in the US. In fact, the banks would seem to prefer to skip the stage of partnering with a finance software package altogether, essentially developing their own Web-based electronic finance packages. However, it seems these will always offer limited functionality and flexibility compared to a comprehensive and institution-agnostic finance tool.

If you look at a package like Microsoft Money, it is far more a front end for 'doing' personal finance online than a traditional personal accounting package. Ironically, the key thing it has going for it is greyed out from the Australian version. This is one of the reasons it fares relatively poorly in our reviews here. It's missing its core feature.

With most of the banks conducting pilot programs, and some of them starting to work with the major finance package vendors, it's only a matter of time until Australia catches up with the US. As you'll see as you read through these articles, the banks cite lack of demand for the slow pace. We suggest you go out and demand they deliver the services from which PC owners should be deriving large benefits now. ■



PERSONAL FINANCE REVIEWS

MYOB FirstAccounts

DATA-TECH

Unlike the other two programs in this section, this one is definitely SO rather than HO. It is aimed squarely at the small but would-be big business, using a proper double-entry system with all the requisite general ledger, sales, receipts, invoice and transaction tracking you would expect from a full-sized accounts package, and has a direct upgrade path to the MYOB accounts package. This does mean less of the fancy graphics, but if you want horsepower, this is the package to look for.

The program comes on three floppy disks, with a requirement (as with Quicken) to register if you want to use it more than 25 times. The package runs under both Windows 3.x and 95, but the design is definitely 3.x-style. The working windows are visually flat, with basic text navigation boxes — no icons here.

The Command Centre menu allows the user to select from General Ledger, Cheque Book, Sales, Purchases and Card File to get started. A video walk-through is not provided, but a sample set of books is. The initial configuration is easy enough: personal details plus ACN and tax numbers.

Once the nuts and bolts are entered, the setup offers a truly impressive list of sample company types from which to choose. A Teletax configuration is also included for those who want to upload files directly into their accountant's system. Configuration can be customised to suit your exact requirements, and there are categories to match your business expenditure and income. There is no provision for investment tracking or listing.

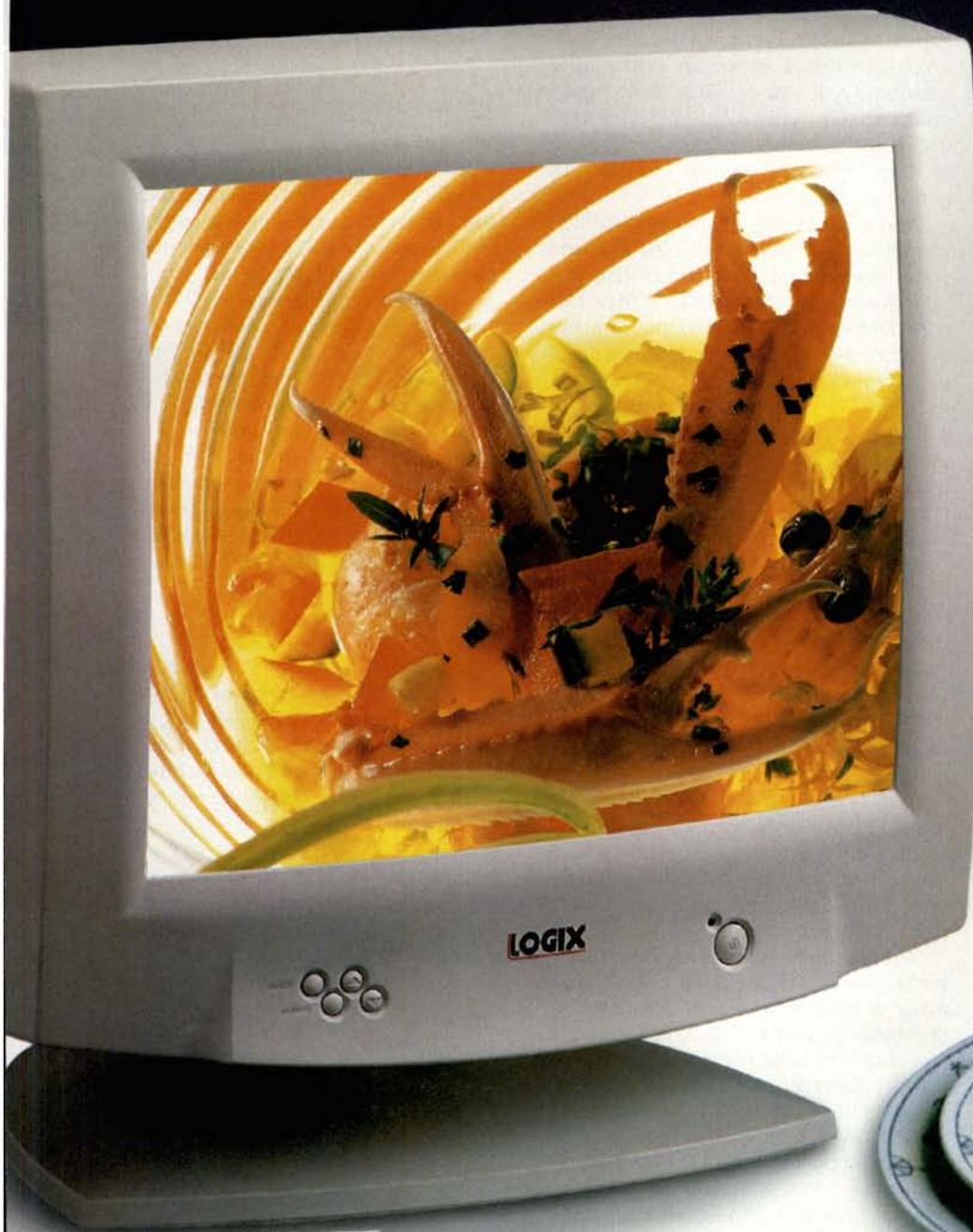
Although the set-up options and configuration knock both Quicken and Money for six, the help system doesn't. It is very lacklustre in comparison, with only a token cartoon figure called Brad who is devoid of speech or movement. Help is merely a help text file — nowhere near the competition in terms of multimedia friendliness.

Using the program is also less of a 'suck it and see' exercise. Thanks to the accounting-style programming, there is only one way to do things right, and if you get it wrong you are told so. Trying to make an entry or write a cheque incorrectly results in a message telling you not to do it — but it doesn't switch you to the screen where you can right the wrong.

On the other hand, transaction track-



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ing is very slick. Almost any entry comes complete with a little arrow on the left, which when clicked will drill down right through the entry's history back to the originator.

One special feature of FirstAccounts is the Card File. This contains a complete and standalone list of all contacts — both customers and suppliers — detailing account, credit, historical and account numbers and their current status — very useful for keeping tabs on tricky customers.

FirstAccounts also excels at reports. There are nearly 80 types, allowing as many layouts as you could want, and these and cheque printing can also be customised. The only letdown in the output area is the graphing, which is nowhere near as slick as Quicken. Still, for the market it is intended for — small business — this is a very competent, upgradable and accountant-friendly package.

- **Distributor** Data-Tech
- **Phone** (03) 9222 9777
- **Online** <http://www.datatech.com.au>
- **Price** \$175
- **In short** Very comprehensive accounting facilities, but not really suitable for the personal finance user.

Money 98

MICROSOFT

The previous iteration of Money, Money 97, was a major leap forwards as far as usability was concerned. Its new interface was friendlier and the facilities greatly improved. But in Microsoft's quest for company homogeneity, the ubiquitous Explorer interface has obviously elbowed out the cosy look. Gone are the chunky graphics, full-screen windows and warm colours.

Instead, Money 98 is now black, blue and grey, with slabby 2D tiled windows and drop-down Web-style windows. This is a definite loss for the user; it feels much less friendly. The program as sold in Australia also has a few quirks, possi-

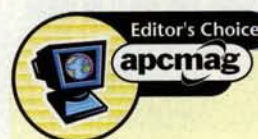
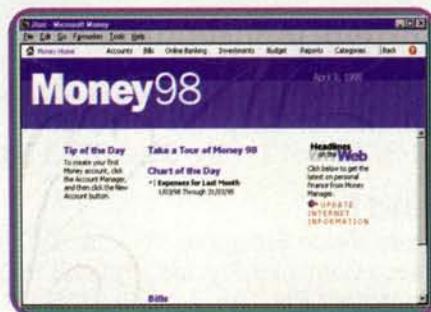
bly as a result of being a modified UK version.

Major sections such as the online banking facility are simply greyed out, with no explanation either in the help or the manual — neither of which are particularly informative. If you do want to set up an online account, you will need to have a UK account with either the Bank of Scotland or Barclays, presumably dealing in pounds sterling.

And if you use the cheque print facility, the amount will be printed as 'pounds and pence' even though the currency default is set to Australian dollars. Despite these hiccups, Money 98 is still a solid program, but definitely aimed less at the small business user than Quicken. Setup to Windows 95 from the CD is very well automated, but rather forcefully loads Explorer without even consulting the user. Once the program is loaded, a well-structured guided video tour takes you through the various facets of the software.

When you have satisfied yourself that you know enough of the ropes to get started, you can set up an account using the wizard feature. This establishes the system to your preferred configuration. Then you can work from a series of tabs which invoke the Account Ledger itself, a Bills window, which gives the lowdown on what is owed and when, Online (as mentioned, irrelevant to most Australian users), Investments, Reports and a new section called Categories. The latter allows a whole range of attributes to be tagged onto both debit and credit entries, to smooth entry and reporting.

The reports themselves are not as comprehensive as Quicken, but offer a good range of options together with reasonable graphing capability. The Budget section is very slick and helpful, especially for home users. It allows the program to project when that \$1 million nest egg will be ready if you save \$50 a week, tells you how much to cut your spending if you want to be out of debt in a year, or what rate of interest will return the best long-term gain for a home loan — useful and easy to understand.



EDITOR'S CHOICE

● Intuit Quicken

If you're looking for the complete bean-counter's package, FirstAccounts is the bee's knees. It has everything your accountant will need, a good upgrade path, and it doesn't distract with fripperies or graphical irrelevancies. Coming fully to grips with it could take a while, however. If you are a Microsoft fan, get Money 98 — but prepare for a disappointment if you loved Money 97's friendly look or want the promised online banking. However, Quicken is still the one to catch. It delivers more than it promises, does so in a way any user can understand, and can still be upgraded to a more powerful package. Excellent value software.

But overall, Money 98 is a step sideways, if not backwards. It has many serious holes thanks to its UK origin, is nowhere as inviting as Quicken, has no direct upgrade path and doesn't have the business capability of FirstAccounts. Not recommended.

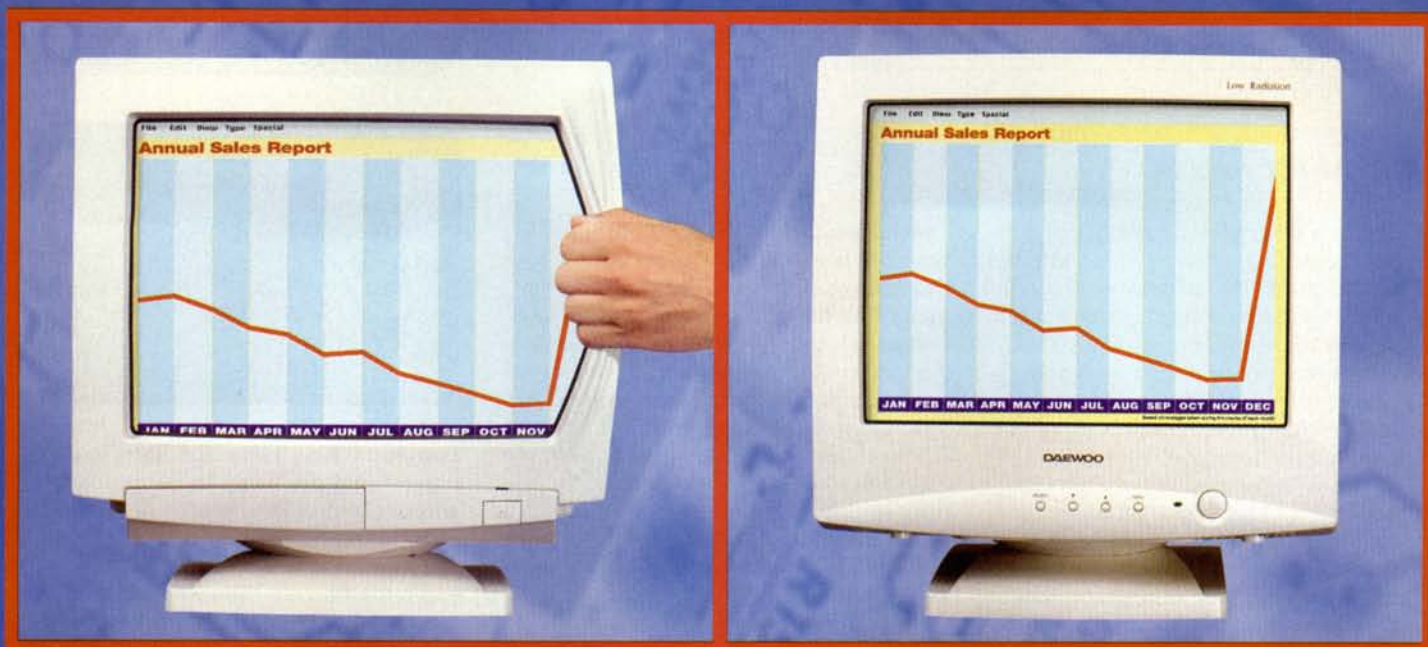
- **Distributor** Microsoft
- **Phone** (02) 9879 2200
- **Online** <http://www.microsoft.com.au>
- **Price** \$49
- **In short** A rather uninspiring development of the previous release. It has too many bugs, and a dull interface, and is suitable for Windows 95 only.

Quicken 6

INTUIT

If Money 98 disappoints with too little pizzazz, Quicken goes to the other extreme. How about an automatic animated, sound-assisted, step-by-step screencam assistant that pops up the first time you use any of the major features? Live full-motion videos to illustrate certain types of transaction or concepts? Or textual, animated and video context-sensitive help?

If you are a first-time user, Quicken 6 will have you in a lather of admiration. It is just so easy to learn. It doesn't go over the top with graphics, and uses easy-to-relate-to



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Write off your PC

The increase in telecommuting, and even just the practice of taking work home, has blurred the distinction between home and office. This has further complicated our income tax returns, because if you start using a home computer for work purposes (rather than just games and school assignments) the associated costs may be valid as a tax deduction.

Australian income tax law allows for deductions to be claimed for expenses incurred in earning assessable income. Computers, however, are classified as capital assets rather than expenses, as they provide a benefit over a number of years. Instead of being claimed as a deduction, a computer has to be depreciated to reflect the fact that its value is gradually declining as it approaches the end of its useful life. The Australian Taxation Office (ATO) defines computers as having an effective life of five years.

There are two depreciation methods, of which the diminishing value method is the most common. This involves depreciating the computer's cost by 40% in the first year and then by a further 40% of the remaining amount (not of the original cost amount) in the second year, and so on. The alternative prime cost method allows taxpayers to annually claim back 27% of the computer's original cost, until there is nothing further to depreciate. The diminishing value rate of depreciation is 50% higher than the prime cost rate, giving higher depreciation deductions in the earlier years. Associated computer costs, such as installation and delivery, are included in the total cost for depreciation purposes, as is bundled software.

The ATO makes a distinction between computers used in a place of business and those used in a home office or study. If a computer is used in a place of business —

such as a surgery in the front room of a doctor's home — depreciation of the computer's entire cost is usually allowable. But with a home office computer, you can depreciate only part of the purchase cost, proportionate to the amount of time the computer is used for work purposes. So, if you use your computer 90% of the time to play Riven and 10% to do work, you can only claim 10% of the computer's cost. In other words, the only way you can depreciate the full purchase cost of a computer is if 100% of the data it contains is work related.

Just as you have to calculate the distance travelled in your car for work purposes if claiming that as a tax deduction, so you must also keep track of the hours your computer is used for work purposes if you wish to claim a deduction. The ATO recommends you work out how many hours a day you use your computer and then deduct the time that is spent on non-work related activities. A diary should be kept recording periods when you use the computer extensively. For more information, see the ATO's 'Guide to Depreciation', which also provides a worksheet to help you calculate your claim. It is available online at <http://www.ato.gov.au/pub/inb/1996/depguide.pdf>.

Not all associated computer costs must be depreciated. If you buy a printer or any peripheral that is valued at less than \$300, or is not expected to last more than three years, then you can deduct the entire cost in the year of purchase. If you decide to rent a computer, it can be a tax deduction. Interest on a loan taken out to purchase a computer is also deductible, as are repair and maintenance costs. In general, however, consult your accountant. This is a tricky area, and you don't want to miss out on any tax advantages.

Claire Waddell

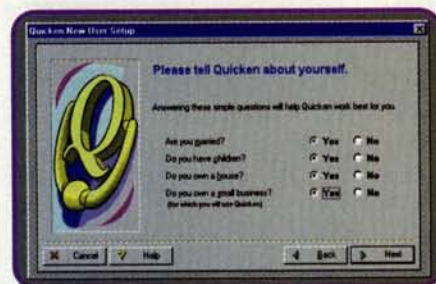
multiple working windows — each with its own working area — which can be tabbed through by means of a window selector bar on the right-hand side of the screen.

It also offers comprehensive menu systems, although these are largely redundant thanks to clear and obvious function icons. Not only that, it can cope with home or business accounts with equal ease, and the Deluxe version (\$20 extra) also offers Invoicing and Home Inventory. Not bad for a SOHO package.

Installing Quicken (to either Windows

3.x or 95) takes a little longer than the competition, but once installed, setup is a real hand-holder. It asks really basic questions about the user, the use of the program (business or personal, or both) your marital, family and property-owning status and, of course, banking details. It then runs a comprehensive yet compact video about how everything works, albeit fairly quickly and cursorily.

The basic elements are accessed either through the menu bar, icon bar or a line of six simplified entry points along the



bottom of the screen. The latter are the biggest and are likely to be most users' choice of entry. They consist of Accounts, Bills, Planning, Investments, Home and Car and Reports. These are all fairly self-explanatory, with the exception of Planning, which can set up advance payments, direct debits and a series of five loan and saving calculators for specific tasks such as home loans, retirement and so on. The icon bar provides slightly more specific access to functions, including, extras such as reconciliation, payment calendar and a to-do section, as well as a useful forecast graph to help visualise future spending.

The program also includes a direct-access Quicken Live Button, but you have to register to enable this, and it really is only another access port to standard Net-based financial info, not Net-based transactions. Importing and translating old QIF files is much smoother and more accurate than in either of the other two programs reviewed. Display-wise, each window has its own controls, such as customise (for displays or reports), and save or switch audio/visual help on or off. This is really useful if you are learning a new section but don't want hints and tips on other open windows.

Paging between multiple windows is achieved via the tab bar, or you can opt to close one and go to another if you prefer. Autofill and graphing aspects are both very good indeed. The program learns your preferences as you go and offers a high degree of automation. Cheques are printed in dollars, and you can upgrade directly to QuickBooks when your business expands. As a first-time package, Quicken still has no competition.

Jeremy Torr

■ Distributor	Intuit
■ Phone	(02) 9562 7955
■ Online	http://www.reckon.com.au
■ Price	\$79.95
■ In short	Still the best of the bunch for usability and comprehensiveness. For business, home or the investor — it has the lot.

Virtual financial planning centres are the way of the future. But do such sites exist, and can you trust the advice they give?

By Claire Waddell

Online finance savvy

The technology age has turned personal finance management into a digital affair. The Internet's interactivity and ability to provide real-time information makes it the perfect medium for researching your financial options. Your PC can become your stockbroker, your accountant, your financial advisor and your link with your bank.

Five years ago, professionals would pay vast sums of money for data compiled by professional information groups such as Butterworths and AAP. Now anyone can go to any number of personal finance sites, and pay a monthly fee (which can be as low as \$14.95) to have access to virtually the same information.

There has been a global trend among finance sites away from simple marketing venture approaches, to establishing virtual financial planning centres. Many US sites now combine sound financial and life management advice with comparative listings of a broad range of products. They also take advantage of the interactivity of the Web, establishing chat forums and bulletin boards.

In Australia, the market comprises many specialist financial sites, and very few 'big picture' sites. David Koch, CEO of Australian Financial Press (author of the My Money site <http://www.mymoney.com.au>) isn't too impressed with Australian finance sites, describing them as

"really bitty and produced by people who couldn't maintain and develop the content". Australians can use The Trading Room (<http://www.tradingroom.com.au>) to manage an investment portfolio, or visit Your Mortgage (<http://www.yourmortgage.com.au>) to negotiate a home loan, but few sites let you do both.

"I've yet to find a completely integrated financial site, either in Australia or internationally, that helps you with everything from wills, to financial planning, to superannuation and mortgages," said Paul Clitheroe, host of Channel Nine's 'Money' TV program.

While the US personal finance sites are unquestionably the leaders in terms of functionality, they have their limitations for Australians due to the parochial nature of the information. Finance sites have to contend with every country having a different tax system, different investment products, and different currency rates. It is one of the few areas of the Web that does not cross international boundaries, making it a perfect niche Internet market.

"[US sites] can be the best-looking sites in the world, but the content means nothing to the Australian investor. In fact, if you follow the advice from American sites, you would more than likely lose money," Koch said.

There are two main proprietary categories of sites: independent media-based sites and sites that spring from a company's line of products. The latter are set up by financial product suppliers to sell those products. According to Koch, "a lot of that is junk mail in cyberspace. [They're] flogging their own product".

The agenda of the owners of a finance Web site is an important consideration. Eric Tyson, a financial counsellor and author of *Personal Finance for Dummies* and *Investing for Dummies*, agreed. "Most sites are sponsored by financial services companies, so that right there biases them. Others are run by people who don't really know what they are talking about and who are simply trying to be provocative," he said.

Good comparative advice is needed in order to make informed financial decisions. "The problem is that most sites are transactionally orientated, when what people really want is educationally orientated," said Clitheroe. The key to success is probably a combination of both; although



investors primarily want access to all available information, they also want to be able to then purchase the chosen product. Few sites do both, but many have it in the works.

From mid-May, My Money will be offering online applications for loans, investments and insurance policies. "We are building kiosks on our site for 12 or 14 institutions at the moment... In effect, we become an online, electronic financial intermediary," Koch said. Ideally, consumers will be able to go to the site with the intention of buying a home and contents insurance policy and, after providing the necessary details, will be given a list of appropriate policy options. They will be able to choose a policy and apply for a cover note. This will also apply to greenslips, term life policies and any other financial product. No more phoning around and comparing the merits of each offer, as the information will all be accessible via one Web site.

The most successful area of personal finance to date is online share trading. The Gartner Group projects that by 2002, 30% of trades will be executed by online or Web brokers. In Australia, just over 100,000 investors applied over the Internet for Telstra shares in the float. Koch's view is that "if you are not going towards online trading as a personal finance site you're stupid... It's what differentiates it from every other medium — it allows you to transact. That's the beauty of the Web.

"It still has a little way to go before the bank will say, here's your \$100,000 and we'll put it through the Web for you and transfer it. It will be traditional methods for the next year, two years, until the other side of it is sorted out; but in terms of applying and doing the deal, it's all there now, and it's secure — as long as you have a secure server."

While trading in overseas shares can be quite easily effected through Internet brokerages, it is not something the average Australian investor dabbles in. "You really would need to be a hugely sophisticated investor," Clitheroe said. "Even major corporations wouldn't pick international stocks; they would go to a financial planner." If you are thinking of trying your luck, <http://www.onlineinvestors.com> provides a comprehensive list of US brokers and comments from the traders who use them.

While most people get a thrill out of the potential for managing their own investments over the Net, Tyson warns people away from getting addicted to following their investments too closely and turning into traders rather than investors. ■

Which sites are legit?

Investing on the Internet has its dangers, and just as there are scams in newspapers, there are scams online. The potential for scams on the Net is higher than in any other medium, as it is so easy for the perpetrators to hide. 'Money' show host Paul Clitheroe's advice is: "If you're dealing with a site and don't know who it is, then don't do it. If it's a big player, still be cautious about fees and charges, but the chances of them stealing your money are nil."

While some people might think it's a good idea to set up a Web site and offer their hot share tips, it's not that straight-



forward. The Australian Securities Commission (ASC) is Australia's watchdog and is always on the lookout for sites that might be taking advantage of consumers.

The golden rule of Internet trading is before committing any money, make sure the Web site you are dealing with is legitimate. An Australian company should list its name and ACN number on the site. It is easy to check whether it is genuine via the ASC's search facility at <http://www.asc.gov.au>.

In Australia, stockbrokers have to be members of the Australian Stock Exchange (ASX) and all members are listed at <http://www.asx.com.au>. According to the ASC, businesses dealing in securities on the Internet, or giving securities advice, have to be licensed. Before following any advice given on a Web page, visit the ASC's Investors page and check that tips are actually coming from a licensed adviser. The majority of people who give investment advice are 'authorised representatives' of licensed dealers or investment advisers. Their name should also appear on one of the ASC registers. The Investors page also lists people banned from practising as investment advisers.

Common scams involve people trying

to raise money for a business, but be aware: it is illegal to raise capital for a company that doesn't yet exist. Also, remember that most investments, including agricultural investment schemes (such as ostrich farming), film schemes and timeshares require a prospectus by law. Currently you cannot register for shares on the Net (unless the company has special permission from the ASC). If you do receive an investment offer that appears to allow you to invest directly, contact the ASC Infoline on 1300 300 630.

If an investment requires you to send your credit card details over the Net, the ASC recommends thinking twice. David Koch, CEO of Australian Financial Press, said: "I don't think you should actually commit your money over the Net. You shouldn't transfer money... You can apply and do the deal, but all the follow-up should be done the old-fashioned way."

Investors need to be particularly careful when dealing with overseas sites. For instance, if a punter invests in a share trust from a German mutual fund, the ASC won't have vetted it, so the investor won't get the same protection as they would if they bought an Australian product. "You have to rely on other countries' security commissions doing it for you, and most of them aren't as good as ours," said Koch. As the Internet crosses international boundaries, it can be difficult for an Australian to find out who the site owners really are, and whether or not they are a reliable source.

We all know the National Australia Bank is a pretty safe source, but how many Australians have heard of the legitimate Allied Bank of Nigeria? "Overseas countries don't regulate the way the word 'bank' is used," said Clitheroe. "To Australians, 'bank' is a powerful word that indicates security, but in some countries you can set up a bank in a corner store." Since such names are not something we readily identify with, it is difficult to tell if the source is legitimate.

"There are scams on the Net for overseas stockbrokers at the moment that say 'invest in these particular shares and do it through us'," said Koch. "They're the same ones that have been calling thousands of Australians every year... They will follow any new medium. The old saying 'a sucker and their money are easily parted' is absolutely correct."

Claire Waddell

Want to take control of your financial situation but not sure where to start? APC checks out Web sites that provide general financial advice. **By Cathie Kennedy**

Personal finance sites

You only need to witness the increase in the number of do-it-yourself investors to acknowledge that a momentum is clearly building. We are becoming more savvy in managing our personal finances, and it's not just those with a large discretionary income who are seeking ways to best leverage their hard-earned dollar. Companies set to gain are responding by developing Web sites that offer personal finance information, products and services.

Sites vary from financial institutions flogging their wares through to online versions of magazines and television programs. Some are independent; some are not so independent. Users need to assess the credibility, impartiality and usefulness of the information. While much of the content on US sites is too US-centric to be of use to Australians, some sites also offer general advice on sound financial and life management principles that is not country-specific. We have reviewed Web sites that address a swag of personal finance situations, from sourcing the best deals in credit cards and interest rates, to help in developing a sound financial plan.

BANKS AND INTEREST RATES

Banks

Most banks have a presence on the Web. While they all naturally feature comprehensive information on their products, there is considerable variety in the value-added services offered. Internet banking is rapidly becoming a standard offering. Some of the more advanced Internet banking sites include St George/Advance Bank (<http://www.stgeorge.com.au>), ANZ

(<http://www.anz.com.au>), Colonial State Bank (<http://www.colonial.com.au>) and Commonwealth Bank (<http://www.commbank.com.au>).

Many bank sites offer useful tools for calculating loan repayments, foreign exchange rates, cash flow, net worth and so on. You'll also find a selection of planning tools that will project your retirement funds, determine the financial needs of your family in the event of death, explore investment models, prepare a budget and simulate your home loan repayments.

Among the more creative bank sites are Metway (<http://www.metway.com.au>) and St George/Advance Bank. Metway's online Life Magazine contains informative home improvement and lifestyle articles, and has the most extensive array of personal finance tools and calculators, including downloadable Excel spreadsheets and Word templates for budget planning. The St George/Advance Bank shopping mall has channels for every capital city, and contains links to hundreds of shopping sites and listings such as restaurants, hotels and real estate agents.

BankCho%ce

BankCho%ce (<http://www.mfaxts.com.au>) is a service provided by Market Faxes, run in conjunction with the Australian Society of CPAs. Market Faxes provides daily updates on bank lending rates. The site contains a financial overview of the Australian market, including up-to-date tables on bank bills and swap rates; exchange rates; lending, deposit and leasing rates; and margin lending tables.

BankCho%ce has a series of helpful tips and introductory articles for consumers on topics such as avoiding or reducing transaction fees on your bank account. The News and Views section contains links to articles on what is happening in the world of banking and financial services. There is also a series of articles that look at the economy, and determine where it is likely to have an effect on official interest rates and policy from the Reserve Bank of Australia. You can search an archive by keywords to find previously published articles of interest.

Like many other personal finance sites, BankCho%ce also has a range of tools including calculators for loans, stamp duty and compounding interest.

Cannex

Research company Cannex (<http://www.cannex.com.au>) focuses on retail financial information for banks, building societies, credit unions, finance companies and mortgage originators. It distributes its research to print and electronic media for publication in Australia, the US and Canada. Cannex claims its information is printed 2 million times a day in various national, metropolitan and regional newspapers around the country.

The Australian Cannex site offers independent, third-party interest rate and product information from over 350 financial institutions. It is invaluable for comparing interest rates on cash management accounts, term deposits, mortgages, credit cards, and business and personal loans.

In conjunction with the Australian Consumers' Association, Cannex also runs a telephone service, Choice Money-Line, which provides consumer information for owner-occupied residential

CANNEX									
Selected Term Deposit Rates \$10000									
Bank	24-Apr-1998	30 days	90 days	180 days	1 year	2 years	3 years	4 years	
Commonwealth Bank	2.35	4.00	4.15	4.30	4.75	4.75	4.75	4.75	4.75
Colonial State Bank	2.35	4.00	4.15	4.30	4.75	4.75	4.75	4.75	4.75
Metway	2.35	4.00	4.15	4.30	4.75	4.75	4.75	4.75	4.75
St George/Advance Bank	2.35	4.00	4.15	4.30	4.75	4.75	4.75	4.75	4.75
Business Loans	2.35	4.00	4.15	4.30	4.75	4.75	4.75	4.75	4.75
Personal Loans	2.35	4.00	4.15	4.30	4.75	4.75	4.75	4.75	4.75
Mortgages	2.35	4.00	4.15	4.30	4.75	4.75	4.75	4.75	4.75
Personal Loans	2.35	4.00	4.15	4.30	4.75	4.75	4.75	4.75	4.75
Personal Loans	2.35	4.00	4.15	4.30	4.75	4.75	4.75	4.75	4.75
Mortgages	2.35	4.00	4.15	4.30	4.75	4.75	4.75	4.75	4.75

mortgages, personal loans, personal overdrafts and credit cards. Details and call costs are listed on the Web site.

While the Cannex system is used mainly by financial institutions for competitor analysis, consumers will also find the information on this site useful, and it saves considerable time phoning around for comparative interest rates.

The site is simple, but there is little need for creativity given its focus.



GENERAL

Financial Passages Online

Financial Passages Online (<http://www.financialpassages.com.au>) is part of an educational program provided by Mercantile Mutual Funds Management. The service is meant to help you take control of your financial life, without feeling pressured into choosing Mercantile's range of financial services and products. The site offers a weekly Australian market review, advice on investments, help finding a financial advisor, and a host of financial links.

The connection with Mercantile Mutual is subtle, and the site does not refer to its products and services in detail. Instead, you'll find lots of grassroots advice for managing changes in your financial life.

Particularly suitable for inexperienced investors and those just beginning to explore personal finance options, the site offers an abundance of elementary articles such as understanding compound interest, the best time to invest, tax-effective investments and tips for bouncing back after redundancy.

A Money Chat online forum is held weekly and covers topics such as successful budgeting, choosing a super fund and managing your investments. Once you have registered with the forum and downloaded the iChat browser plug-in, you'll be notified of the time and topic of the next session. Transcripts of previous chat sessions are available.

The site also has a host of downloadable organiser software including calculators to help budget and plan for your home mortgage, life insurance and superannuation, along with registers for keeping track of investments and household assets.

Mercantile Mutual has adopted an innovative approach to its Web site, and is a good example of using the interactive and educational nature of the Web to creatively promote a business.

SOFTWARE

Quicken

Intuit Australia, developer of the Australian version of accounting software Quicken and QuickBooks, is developing a financial services Web site based on the US model (<http://www.quicken.com.au>). While the site was still under construction at the time of writing, APC was able to preview a range of resources.

The initial site has six key areas for small businesses and individuals. The Shares page provides real-time prices for online trading in Australia or any of the world's 14 major exchanges. Another page provides advice on various types of insurance, while the mortgage facility allows you to check which bank's offering best suits your circumstances.

One of our favourites, the Banking page, allows you to compare rates for credit cards, at-call and term deposits, and personal and commercial lending. In addition, there is a listing of company



rates and conditions from over 80 mortgage providers, and an online application form. The Banking page has a range of tools to help calculate mortgage repayments, stamp duty and so on.

The site also lists rates for vehicle finance and insurance.

Intuit Australia no doubt hopes its Web site will further strengthen its position in desktop financial resources and products market. It will certainly be worth a look once it's complete.

MEDIA

My Money

Promoted as David Koch's financial supermarket, the My Money site (<http://www.mymoney.com.au>) provides comprehensive personal finance information for the average investor and financial consumer. The home page leads you to the site's seven key areas: Banking, Insurance, Investment, Adviser, Taxation, Earn and Spend, and Retirement. Koch's daily radio and television finance reports are also posted, ensuring access to the most up-to-date reports and stories.

My Money caters for a range of personal finance situations and interests. As an example, in looking for advice on purchasing an investment property, APC found numerous articles including golden rules for property investment, details on

the Australian Taxation Office's review of 100,000 property owners, a guide to property trusts and tactics for auctions. There was also a section that provided a useful price outlook on property selectable by city, and a rundown of prime areas for investment properties within your chosen city.

A Tip section provides scant advice on a range of personal finance matters, from the dangers of quick money-making schemes such as Wally Worm, through to cutting your car insurance premium, fixed versus variable home loans, investment risks and surviving the sack. The value of such token coverage is questionable, as many of these subjects deserve in-depth treatment.

Overall it's a comprehensive, well-rounded site.

Personal Investment

Based on the Australian monthly magazine *Personal Investment*, this site (<http://www.personalinvestment.com.au>) provides information on making your money work for you. As the name suggests, the site targets those who enjoy tinkering with their finances rather than serious large investors, and covers topics such as do-it-yourself investing, estate planning, smart car buys for 1998, and residential property investments. Most are extracts from articles in the latest publication, and provide sound, practical advice.

To its credit, Personal Investment has taken advantage of the interactive nature of the Web, and recently launched an Online Forum that includes conference areas on property, sharemarket, small business and investing. Users can join online discussion groups and confer with others on issues that affect their investment.



Personal Investment also provides access to Australian share prices and related information through a sub-

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scription-based service, Shares Online, or the pay-as-you-go Trading Room. A noteworthy feature of Trading Room is the ability to search an archive of over 50,000 news and analysis articles from financial and business publications in the Fairfax stable including *Business Review Weekly*, *Personal Investment*, *Shares*, *The Australian Financial Review*, *The Sydney Morning Herald* and *The Age*. The articles date back three months.

Fairfax has developed a clean, uncluttered style for its online publications. Personal Investment is an easy-to-navigate site, although the information available is not as extensive as that found on the My Money site.

Your Mortgage

Your Mortgage (<http://www.yourmortgage.com.au>) was the 1997 winner of the *Australian Financial Review*/Telstra Internet Site Award in the Best Investment and/or Financial Site category. And deservedly so. Based on the printed magazine by the same name, this site leverages the resources of the Internet by not only publishing useful material on mortgage essentials, but including an extensive list of links to hundreds of related categories. These range from financial planning resources to sites with glossaries and dictionaries, Australian interest rate monitors, and online stock and commodities brokers. Each linked site has a useful ratings guide that assesses the quality of its information, along with a one-paragraph overview of its contents. This is particularly useful for those surfing the Internet with anything less than a 56Kbps modem or ISDN line, as you can view the sites that will be of most value rather than waiting for pages to download, only to find the information does not address your needs.

Your Mortgage is a good starting point for those investigating mortgage options. You'll find lots of useful money-saving tips, an overview of what's on the market, and economic commentary on current mortgage rates. There's also a useful glossary of mortgage terms. Your Mortgage lists property price information from Australian Property Monitors, daily updated interest rates from major financial institutions in each state, and a range of useful tools and calculators.

Each of the main categories include articles from the magazine, offering simple, practical advice on the best way to manage your mortgage.

US SITES

Money Online

The online version of US monthly publication *Money* (<http://www.money.com>) was one of the most comprehensive sites covered in this review. The site is updated daily with feature articles, and has an extensive list of departments including stock quotes, business news, mutual funds, money tools and personal portfolios. A useful archive



allows you to conduct a search on all *Money* issues since January 1986 by keyword/phrase, author and date.

Money has two bulletin boards: one where you can talk about anything relating to money, and another where journalists and editors from the magazine offer their insight. There is also a weekly chat forum, MoneyLive, along with transcripts from previous forums.

The page layout is cluttered, although this is perhaps a design strategy to reflect the depth and breadth of information on the site. The drawback is that it's necessary to spend some time navigating the pages before you can appreciate the content.

Like most international sites, some information is specific to that country — such as the Money College Guide and Stock Quotes — although there is still plenty of material relevant to those living outside the US.

MoneyInsider

While Microsoft MoneyInsider (<http://www.moneyinsider.msn.com>) is a US site, it contains enough generic financial information to be of interest to Australians.

The site naturally has a swag of US-centric resources such as bank rates, US investor market overview, and links to discount brokers and financial advisers, and many of the feature articles reference local resources. However, it also has a series of articles on universal life and financial management principles.

The focus is on managing your finances to create the lifestyle you want, and in addition to money advice features a series of well-being articles such as 'Taking Steps to Find Inner Peace' and 'Six Steps to Breaking the Pack Rat Habit'. There are a range of tools and calculators, although many are US-specific.

The site is surprisingly passive given it is from the MSN stable. One would expect a more creative approach from Microsoft.

MoneyInsider is worth a look, but there are more useful sites on home turf.

Wall Street Journal Interactive Edition

The Wall Street Journal (WSJ) Interactive Edition (<http://interactive.wsj.com>) is constantly updated. It costs \$US49 to subscribe — or \$US29 if you are already a subscriber to *Wall Street Journal* or any of its sister publications — which gives you continuous news coverage of business, financial markets and technology. Subscribers can access Barron's Online, an investor-oriented service; Smart-Money Interactive, a personal finance service based on the monthly magazine; and Money Bulletin, which provides the latest information on US market activity.

The Personal Journal facility allows you to customise pages according to your interests. It also has a Portfolio feature



that helps organise investments and track current prices on stocks and mutual funds. While this would be specific to US investments, it is a useful tool that many Australian sites should consider developing.

This is the only fee-based site reviewed. As you would expect from *Wall Street Journal*, it is comprehensive and provides subscribers with a host of additional services such as free searching in the Dow Jones News/Retrieval Publications Library, which includes 5,000 trade and business publications.

This site is more than just a personal finance reference, and is targeted at those with a serious interest in finance and investment. ■



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The idea of the Internet as a global marketplace is becoming a reality. We've all heard about people buying books, CDs and computer products via the Net, but there are also links to what are arguably the purest markets: the stock exchanges. By Stephen Withers

Investment sites

Share trading is a natural for the Internet, as there is no physical product to be delivered. In Australia, many shares are already uncertificated — your holding has no physical existence. Even when certificates are still used, they are typically held by the broker to facilitate any subsequent sale.

It has long been possible to trade on a foreign exchange by opening an account with an overseas broker. What the Internet brings is the same easy, real-time access to US market movements, news, and background information, plus a cheap way of placing orders with your broker. Whether you should be doing this is another question, but if you're satisfied it is the right way to go, it's almost as easy as buying and selling Australian shares.

While Internet users are accustomed to obtaining free information, they soon find that investment sites break this pattern. Stock exchanges charge substantial fees for real-time data, and Internet site operators generally pass these on either by charging subscriptions or by limiting access to their own clients.

Only some of these sites can be displayed on a 640 by 480 screen without horizontal scroll bars. Overly wide page designs inconvenience those with 13 or 14in monitors or older notebook computers, anyone compensating for limited eyesight by driving a larger screen at low resolution, and those wanting to tile multiple windows on a big screen. We found it a real hindrance.

AUSTRALIAN SITES

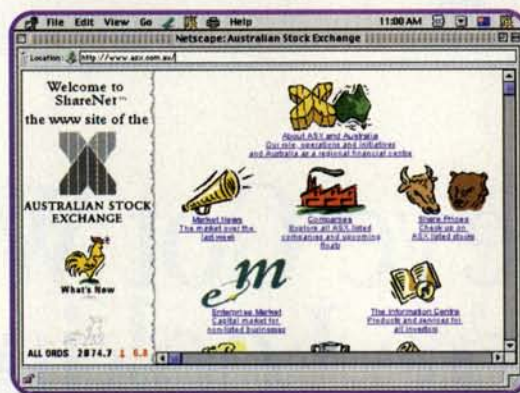
ASX

The Australian Stock Exchange Web site (<http://www.asx.com.au>) is an obvious early port of call for the investor. The material presented is a mix of information, marketing material and propaganda.

The information content includes the All Ordinaries 'ticker' on the home page, and key local and international market statistics such as the top 10 stocks by volume. Basic details of listed companies can

be retrieved (including their telephone numbers, fax numbers, addresses and URLs), and share prices are updated at midnight following each trading day.

Marketing materials include the Information Centre and the broker referral section, which identifies brokers that meet selected criteria (such as geographic location, the availability of Internet trading or female advisors, and the size of investment proposed).



The 'simulated trading' feature turns out to be a simple game, apparently designed to show how a spread of investments held for the medium to long term would yield the best returns.

The site is fairly attractive and the pages aren't too slow to load. The design, however, is not 640-friendly, and we encountered JavaScript errors on a few pages, including one when attempting to scroll through the result of a broker search. We did like the way supplementary windows are opened to present certain kinds of information, avoiding the need to reload the referring page.

Commonwealth Securities

Part of the Commonwealth Bank, Commonwealth Securities (<http://www.comsec.com.au>) is another of this country's most popular investment-related Web sites, even though it doesn't provide a lot of information to non-clients.

The casual visitor can view last night's share prices, market commentary and the

CBA's economic commentary. Small investors might be interested in the price and composition of the bank's Aussie Shares packs (small parcels of shares in three or more major Australian companies which it buys and sells with lower than usual brokerage charges).

Commonwealth Securities clients may access live share prices, obtain charts showing share price and index movements, maintain a portfolio valuation, set a 'watch list' for stocks of interest, and place orders.

Brokerage on orders placed via the Internet is a very competitive \$29 for up to \$10,000 and 0.3% thereafter. Commonwealth Securities claims legal reasons prevent it from signing up clients electronically (a widespread practice in the US). Instead, it gives potential customers the choice of downloading the necessary forms to be printed, completed and returned, or requesting that they be mailed out.

This site is 640-unfriendly to the extent that the horizontal scroll bar appeared even when all the material within a frame was visible without scrolling.

DirecTrade

Operated by the Macquarie Bank, DirecTrade (<http://www.directtrade.com.au>) provides a round-the-clock service for placing orders relating to all shares, warrants and company options listed on the ASX, with 128-bit encryption security.

Brokerage rates are \$49 per trade where the order value is less than \$10,000, or 0.5% per trade to a maximum of \$99. This is cheap when compared with traditional brokers, but more than twice that commonly charged in the US (and that's before our political leaders impose a "broadly-based goods and services tax" on such transactions!). Don't get too excited by that \$99 limit, as DirecTrade will not accept orders over \$20,000. On the other hand, a client's 28th trade is free of brokerage for a limited, but unspecified, period.

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Unlike the other Australian sites we visited, DirecTrade accepts online applications from new clients — providing they have at least \$3,000 deposited in a Macquarie Cash Management Account.

Investors can find information of interest elsewhere on Macquarie's site, including prices for the banks' own unit trusts, a daily equities report, and a weekly economic report. Macquarie's 'Inner Circle' clients may access a wider range of reports and are provided with a portfolio tracking service.

E*Trade Australia

Announced shortly before the deadline for this article, E*Trade Australia (<http://www.etrade.com.au>) was not accessible in time for us to provide a first-hand report.

This US service has entered Australia through Nova Pacific Securities, and will charge \$49.50 per trade with a limit of \$75,000, or 0.1% thereafter — substantially more than the \$US14.95 it charges at home, and well above the \$29 set by the Commonwealth Bank.

Clients will be given access to a range of financial information, including live stock prices, AAP and Reuters news feeds, company profiles, charts and portfolio tracking.

Future plans include allowing local clients to trade on US markets, and the formation of partnerships to offer complete packages including PCs, Internet access and E*Trade access for investors who don't already own the necessary hardware.

Sanford Securities

Sanford Securities (<http://www.sanford.com.au>) provides an example of the way a new entrant to an industry can build its operations around current technology instead of having to graft it onto existing structures. Consequently, it claims the lowest brokerage charges in Australia: just 0.1% for trades up to \$50,000 placed via the Internet, with a minimum of \$29.95. While that is still higher than the rates prevailing in the US, it's not that much higher. Whether or not it is cheaper than Commonwealth Securities depends on the size of the trade.

One way low prices can be achieved in any industry is by unbundling services — do you remember the way we used to get 'free' technical support before software prices tumbled? Not surprisingly, Sanford offers hardly anything for free. The home page shows the All Ordinaries, company news headlines and the five

most active stocks, but that's about all most of us get.

Sign up as a client (which will cost you \$65, so you'll have to do several trades before you've recouped the entry fee), and Sanford will email you a daily report on your watch list of up to 20 stocks; provide research reports, investment digests, news and ASX indices; and admit you to its discussion group. The Standard service (\$9.95 per month) provides online access to the watch list and ASX indices, real-time share quotes, charts and historical data. Go up to the Premium service



(\$29.95 plus ASX royalties) and you get an unlimited watch list, company news, today's trades, depth of market information, interactive charting and more. Unfortunately, the site's design is not 640-friendly.

StockWatch

StockWatch (<http://www.stockwatch.com.au>) is one of OzEmail's value-added services. Its Internet customers get full access without additional payment; customers of other ISPs can subscribe for \$19.95 per month; and closing prices are available free to all comers.

In addition to live prices, StockWatch provides downloadable files of daily prices in comma-separated, tab-separated and StockEasy formats. Furthermore, there's business news from AAP (including international market news, Australian economics, stocks to watch and financial highlights), a weekly summary (with indices, key commodity prices, exchange rates, cash rates and commentary from Mercantile Mutual), a market update contributed by a financial consultant, an investment advisor's 'hot stocks', a series of articles on technical analysis contributed by the Australian Technical Analysts Association, a list of

proposed floats, and company press releases.

The portfolio tracking facility works nicely, and it can be used either to value a portfolio (by entering the number of shares held) or as a watch list. Although StockWatch won't produce charts for an arbitrarily-selected stock, it will chart price movements for shares listed in a portfolio.

Only an array of oversized buttons stops StockWatch from being 640-friendly — almost all the material on its pages is visible in a narrow window without scrolling. There is a choice of HTML, ActiveX and Java-based versions of the site.

Trading Room

Operated by Fairfax, Trading Room (<http://www.tradingroom.com.au>) is probably the closest Australian investors can get to 'something for nothing' — providing they don't put much value on releasing their personal details including address, fixed and mobile phone numbers and email address. Still, there's nothing to stop you entering bogus details when you sign up — if your registra-

tion is subsequently cancelled, at least you've had time to look around and decide whether the information is worth the level of disclosure sought.

A few parts of the site are open to the public, such as the ubiquitous closing prices. Most require membership; however, there is no indication whether it's needed for a particular page until you try to enter. Functions requiring payment include company announcements (40 cents each) and the archive of articles from Fairfax publications (a hefty \$2 per article). Their use requires a credit balance in a Trading Room account that can be topped up from your credit card via either a secure Web page or by fax.

Other available information includes latest share prices; turnover by sector; the top 20 movers in the ASX 100 and in the whole market; warrant, bond, unit trust and derivative prices; local and overseas indices (more comprehensive than the list provided by the ASX site); foreign exchange rates; and interest rates.

Some of the information is patchy. For example, at least one substantial organisation was missing from the list of interest rates, and the list of brokers looks as if it is limited to those who paid to be included. Trading Room is generally 640-friendly.



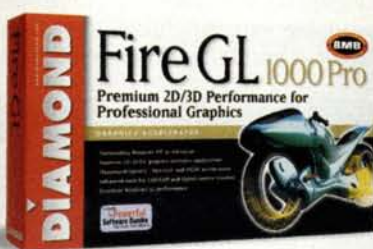
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OVERSEAS

For those interested in US markets, the Internet provides a way to obtain detailed and timely market information. There are also a wide range of brokers that offer online trading.

Yahoo and Quote

Yahoo (<http://quote.yahoo.com>) and Quote (<http://www.quote.com>) are both good sources for those interested in US markets. They provide delayed (by 15 or 20 minutes, depending on the exchange) share prices and price history charts. We prefer Quote's charts, which show the traditional high-low-open-close points plus a trend line, and are drawn larger with a linear scale. Yahoo's non-linear scale has the effect of compressing the highs, although it also means the line drops the same distance when a stock loses half its value whether the starting point is \$70 or \$20.

Yahoo's share price service covers the NYSE and Nasdaq, and reports the Dow Jones and Standard and Poor's indices. News (mainly from Reuters), SEC filings, company profiles and research reports are also available.

Quote delivers NYSE, Nasdaq and Amex quotes, plus Dow Jones, Standard and Poor's and Nasdaq indices. Although much of the other information is only available to subscribers (from \$US9.95 per month) there is a useful amount of free material, and free trial subscriptions are available.

Quote draws on the news resources of AP, Reuters and Newsbytes, and also provides a transcript of the 'Nightly Business Report' TV program. Yahoo is 640-friendly, Quote isn't.

Investor

Launched just as this article was being completed, Investor (<http://www.news.com/investor>) is jointly produced by CNet and Bloomberg. There is an emphasis on the technology sector, but not to the exclusion of the broader economy. The involvement of Bloomberg brings news resources not offered by the other investment sites mentioned in this article. While the share quotes and indices are limited to US markets, Australian business news is included (and featured in the headlines when we visited), so Investor is worth visiting even if you only put your money in the local market.

Twenty-minute delayed quotes can be obtained by name or ticker symbol, and a

thumbnail chart is presented alongside the figures. Detailed charts for three months, six months, one year or five years can be displayed, and while these are attractively presented, we favour the additional detail in Quote's charts.

An attractive feature is the provision of quotes for companies in the same technology market sector, such as PC software or the Internet. Like CNet's other services, Investor is 640-friendly, and its features are available without charge or registration. Personal portfolios, an earnings calendar,



historical data, SEC Filings, options pricing, mutual fund tracking, and currency rates are promised during the next few months.

ONLINE TRADING

The US market for online trading is big. One broker, Charles Schwab (<http://www.schwab.com>) reportedly has 1.4 million online accounts, worth a total of \$US103 billion. The market is also extremely competitive, with brokerage as low as \$US8 per trade regardless of quantity. Furthermore, US brokers are able to open accounts for new customers online. DLJdirect (<http://www.dljdirect.com>) provides this service, giving new customers three days to settle their first trade by cheque. The downside is that not all firms will do business with overseas clients, and DLJdirect is one such example.

Of the firms we contacted that do overseas business, the most responsive were E*Trade (<http://www.etrade.com>), \$US19.95 per Nasdaq trade, \$US14.95 for other exchanges, not 640-friendly) and National Discount Brokers (<http://www.ndb.com>), \$US14.75 per trade. Web Street Securities (<http://www.webstreetsecurities.com>), \$US14.95 per trade, free for Nasdaq shares, not 640-friendly) also provided the details we requested, but took an additional working day to reply.

Basically, foreign customers need to complete the broker's account application form plus tax forms W-8 and 1001. These

forms may be downloaded and printed, or the broker will send them on request. Funds can be deposited into the account either by sending a cheque (payable in US dollars — expect your bank to charge a service fee of around \$10) or via wire transfer (faster, but more expensive at around \$25). Once the money is in the account, trading can begin.

Although low brokerage is attractive, it isn't everything. Gomez Advisors (<http://www.gomezadvisors.com>) has reviewed the field of online broking and produced a scorecard that summarises brokers' performance on a number of criteria. Since Gomez is a consultant to the Internet broker industry, there is a possibility of bias towards their clients, but it is a guide. The top five in the most recent survey were: DLJdirect (does not take overseas clients), Waterhouse Securities, Lindner Funds (requires clients to have a US mailing address), National Discount Brokers and Web Street Securities.

Gomez gave SureTrade (<http://www.suretrade.com>) a good score for cost — just \$US7.95 per trade, yet account holders still have access to research information and real-time quotations. Charles Schwab was given a top ranking for customer confidence, and this firm provides a 640-friendly site and offers international accounts with a minimum balance of \$US1,000.

Generally speaking, US brokers provide little or no market or background information to non-account holders, and what little there is can generally be found at the major finance sites.

EUROPE

Yahoo also covers the major European markets at <http://finance.yahoo.co.uk>. This page delivers 15 to 30-minute delayed quotes from the London, Frankfurt, Milan and Paris stock markets. Extensive business news coverage is provided by leading agencies including Reuters, PA and AP. Exchange rates, company profiles and other types of information are also available.

The London Stock Exchange Web site (<http://www.londonstockex.co.uk>) is disappointing compared with the ASX's, being little more than an electronic brochure. Although there is a list of brokers, you can't search it by desired criteria. If you come across a firm that offers Internet trading (our searches were fruitless), you can at least see if they are members of the Exchange — although checking that the site really is operated by the firm concerned is another matter. ■

Cyberbanking

Australia will need to take a leap in both banking momentum and consumer demand in order to reap the benefits of Internet banking.

By Claire Waddell

Ecommerce is the buzzword of 1998, and online banking is the buzz service. Yet for all the attention online banking has received, it is still virtually nonexistent in Australia. Of the more than 50 banks in Australia, only three — the Commonwealth Bank (CBA), Adelaide Bank and St George (which is consolidating its online service following its merger with the Advance Bank) — provide consumer online banking services, and none interface with personal finance packages. Many customers still have to key in the data from their bank statements.

Ideally, customers would be able to manage their finances wholly from their computer by integrating online banking transactions with money management software. The only contenders in the personal finance software market are Microsoft's Money and Intuit's Quicken, both of which have close to 100 online banking partners in the US.

Internet banking was pioneered in the US during the late '80s, but browser-based services have only come into their own in the last two years. Microsoft and Intuit responded quickly, redesigning their software as front ends for Internet banking, and signing up financial institutions to support them. US banks decided not to compete with the specialists, and accepted their technologies.

Compared to their US counterparts, Australian banks are not even in the race. Intuit sales director Steve Rickwood said, "The Australian public just hasn't demanded it... [The US has] 10,000 banks... a big difference to four plus a few. Australia doesn't need a third party like Intuit."

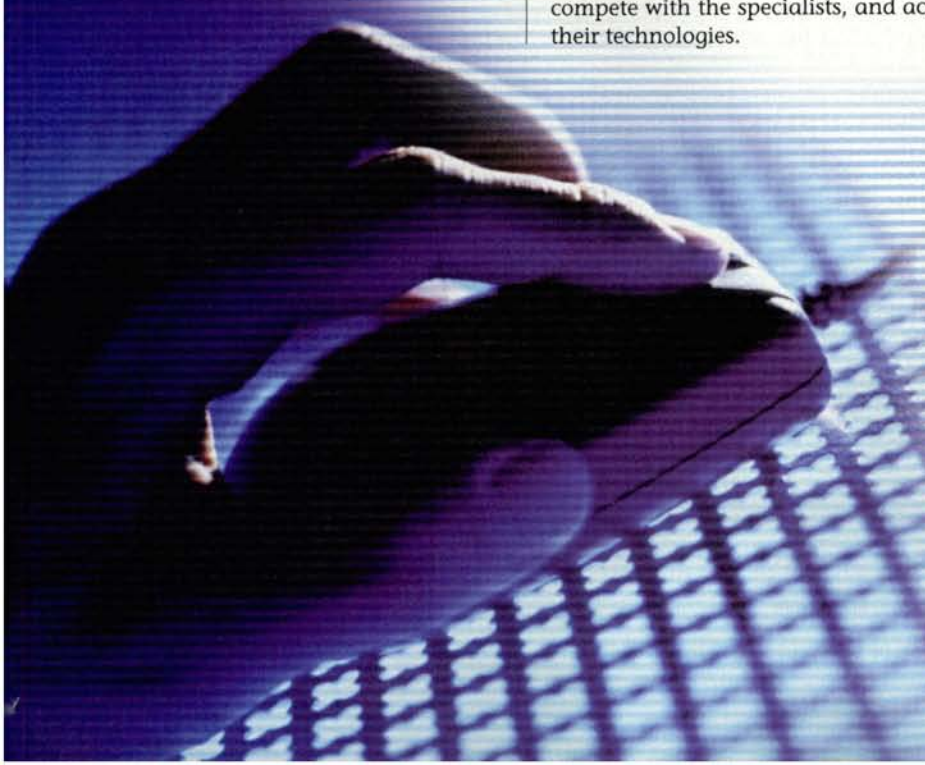
The Australian cyberbanks are all moving to browser-based software. The advantage of Internet banking is that it can be used on any computer that has a browser and Internet access, whereas PC banking requires the user to buy software, load it onto a PC and then hook up to the bank.

"I'm a bit ambivalent about PC banking," said Alain Rondot of Price Waterhouse Financial Services. "If PC software provides Internet capabilities then maybe it will grab the market. As it is now, banks provide the Internet services, placing PC software out of the loop." He said he sees the future of online banking as being restricted to a browser and some Java applets to download updates unobtrusively to the user.

Drew Unsworth, CBA senior manager of electronic business products, said personal software packages are "designed more for managing your finances holistically, than your day-to-day banking needs". When CBA launched NetBank, its day-to-day online transactional banking service in February 1997, it decided not to integrate Quicken into the new system. The bank already had a dial-up service, QuickLine, which was developed by Intuit four years ago.

"We had QuickLine before Quicken integrated with banks in the US," said Unsworth. "QuickLine was already out there, it works, and it's not something customers are bashing us over the head for."

QuickLine is a personal finance program that allows users to access their account balances, make payments to any financial institution in Australia, and request funds transfers in advance. QuickLine's advantage is that users do not have to rekey transactions into their cashbook. Small-to-medium businesses are the predominant users, although about 10% are personal users. QuickLine users are charged \$5 for 40 transactions per month. Customers need to first purchase QuickLine (sold for \$79 from CBA branches), then load it onto their computer, and dial



straight into the bank — no Internet access is required. Australian banks have tended to keep parallel strategies operating: point-to-point dial-up and the Internet.

Last year Quicken and Microsoft took a step towards creating a joint standard by making their code available to anyone to use in writing programs — the Open Financial Exchange. Rickwood said no Australian bank has taken the offer up with Intuit.

Some banks are a bit hesitant to allow a third party to come between them and their customers, and want to avoid any surrender of control of financial transactions.

In 1994, the US Department of Justice (DOJ) intervened in Microsoft's planned acquisition of Intuit software. The heart of the issue was, and still is, the fight over corporate power and its control of the Internet — for example, online freedom group NetAction (<http://www.netaction.org>) took a hard line in its white paper titled *The Microsoft-Intuit Merger* by Nathan Newman.

"Microsoft set out to dominate the emerging electronic banking field by every means possible. By packaging these product services together, and with increasing control of the desktop browsers, Microsoft is building an integrated financial and commercial empire where customers will use Microsoft-produced software to access Web sites using Microsoft server software, then buy products sold by Microsoft, and have the transaction processed through a bank using a system owned by Microsoft. This is a level of vertical commercial integration never before seen."

Local developments

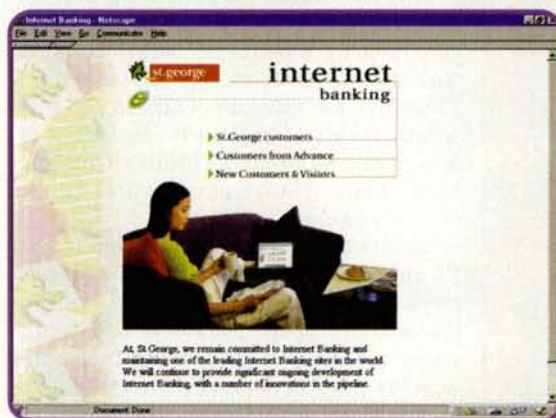
ANZ is the first Australian bank to procure a personal finance application partner. "It's a general trend for non-financial players to have a stake in the value-chain of financial transactions. It's just the way it will be," said Geoff Browne, ANZ's senior manager of remote channel development.

The bank plans to launch ANZ PC Banking this month, and expects to integrate the browser-based software with Money after the launch. Browne said Money was chosen because of Microsoft's demonstrated willingness to work with the bank. As an alternative, ANZ PC Banking will offer an inbuilt money manager, similar to Money, that will allow users to categorise their transactions for budgeting, and there will also be an electronic cheque-book stub with automatic recon-

ciliation. ANZ PC Banking seeks to cater for holders of multiple ANZ accounts who want to manage their money themselves. It will also support Mac users at no extra cost.

A Price Waterhouse study in April found that four out of every five survey respondents who were willing to use or currently used telephone banking were also willing to use Internet banking. Internet banking today has little more to offer than phone banking, and requires users to dial up their ISP and then go to their bank's Web site, rather than just picking up the phone.

Angela Tsagris, NetBank project manager, admits that CBA's online service "is an extension of phone banking, as it's the same type of service". The only extra service available through NetBank is the ability to view the last 150 transactions



from an account statement, compared to accessing the last five with phone banking.

The number of customers using the bank's online services is approaching 30,000, whereas millions use phone banking. Similarly, Advance Bank online, Australia's first cyberbank, has about 25,000 users.

Advance Bank has led the way in Australia, and was one of the first five banks in the world to offer online banking services, said Rondot. "It has had more time to understand the dynamics... it's the pioneer and the others are just the followers."

Since its takeover, Advance has taken on the St George branding, but its Internet services remain the same. (For more information about online banking services, see APC May, page 145.)

Brighter future

By the end of this year, 63% of Australian banks intend to provide Internet transac-

tions, according to Price Waterhouse research. Westpac and National Australia Bank are working on online banking services, but have not set release dates. While the banks are often accused of being slow to introduce Internet banking in Australia, consumers have also been slow to adapt to the new technology. Price Waterhouse found in a recent study that there are three issues limiting the uptake of Internet banking services: the perception that the Internet is unsafe; the inability to use and understand the Internet; and limited access to the Net.

Increased convenience is likely to drive customers online, and paying bills is one of the most sought-after services. Electronic bill payments allow customers to pay bills straight out of their accounts, preventing third parties from having access to people's personal banking information. The advantage of paying your bills over the Internet, rather than via phone banking, is that users don't need a credit card and have the choice of drawing funds from their savings or cheque account.

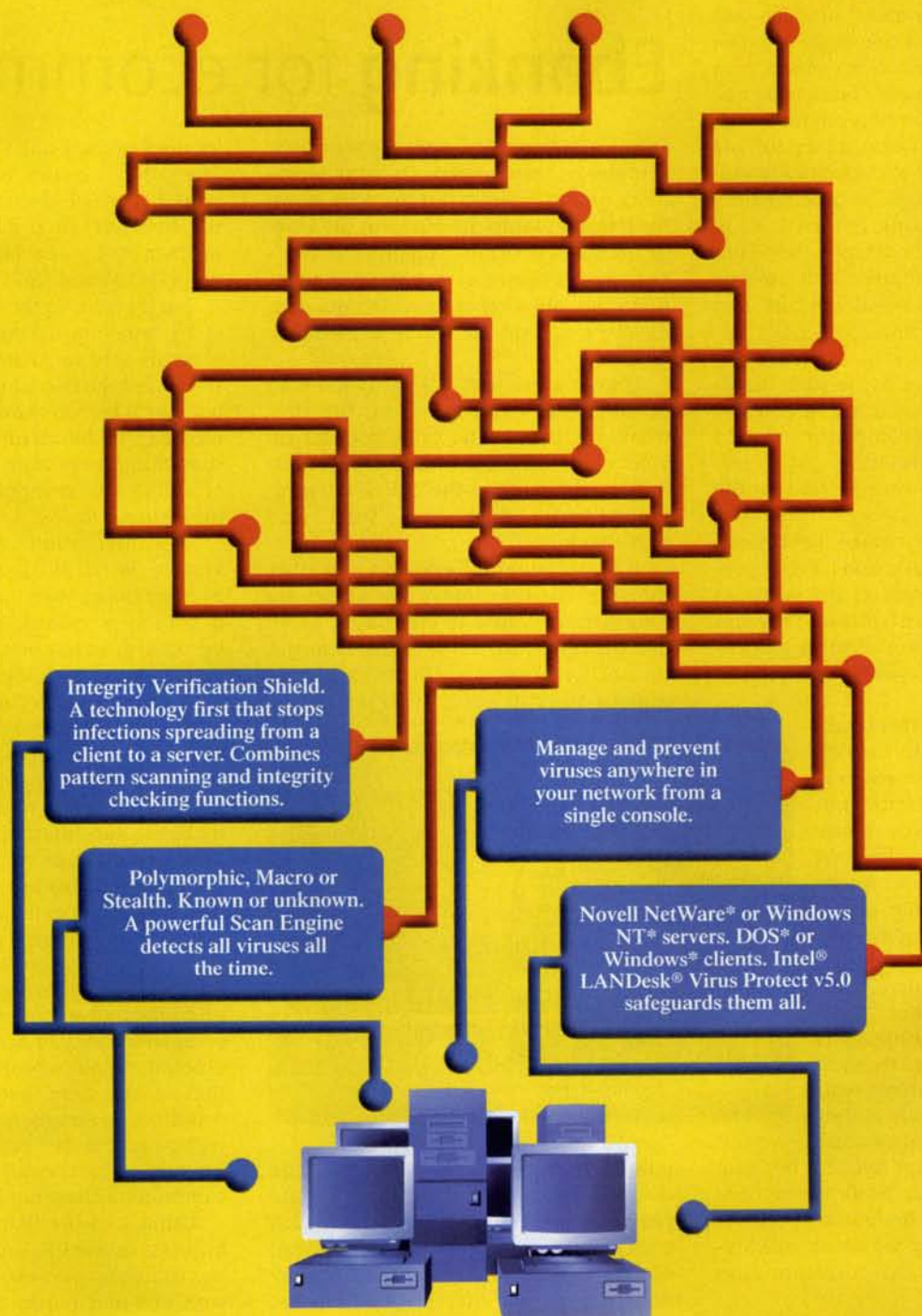
The new BPay scheme will standardise the banks' various bill payment systems. St George and CBA now offer BPay, but both banks have had extensive bill payment systems for years. CBA has over 450 registered organisations on its bill payee list. BPay still involves getting online, and then entering in a

BPay reference number which authorises the bank to debit the account. Most major billers are participants in the scheme, including Optus, AGL, Elgas, Telstra and Sydney Water.

All bank fees are lower if you stay out of their branches, and online banking transaction fees are the same as any electronic transaction, including ATM withdrawals and phone banking. Sometimes, however, a monthly access fee is charged. Access to NetBank is free for personal users, while business users are charged a flat rate of \$15 per month. ANZ plans to charge \$5 per month for access, regardless of account type.

Most of the banks have loan and credit-card application forms online, but that's as far as the Internet service takes you. So far only US bank Security First National provides instant approvals on unsecured loans over the Net. You can apply for up to \$US10,000 and receive an instant response; if approved you will receive a cheque in the mail the next day. RAMS,

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one of Australia's largest mortgage lenders predicts 50% of its home loan applications will be sourced from the Internet within three years.

The market for financial products and services is becoming increasingly complex in Australia: organisations other than banks are starting to offer bank products, and banks are cross-selling products such as health insurance. Financial services are being commoditised and eventually customers will go through an intermediary rather than go to a bank. In the US, Intuit and Microsoft already act as go-betweens with their personal finance software and Web sites (<http://www.quicken.com> and <http://moneyinsider.msn.com>).

As AMP and the new supermarket-owned banks, Coles Myer and Woolworths, plot their way into the banking sector, the increased competition should push banks into providing better services, both over the counter and on the Net.

Supermarkets may make ideal banks due to their accessibility and longer opening hours, and because of the synergies between shopping and banking. They also already have the network and the processing capabilities to provide similar services as a bank.

The new supermarket banks are also expected to launch Internet-based payment services. Ian Hawthorn, partner in charge of the Price Waterhouse financial services practice, told *The Australian Financial Review* that at least six major corporates outside financial services were known to be formulating Internet banking strategies.

Perhaps the real drive behind Internet banking is going to be smart card technology. The biggest problem with Internet banking today is that customers can't withdraw cash

— and this is the most frequent banking transaction. Advance Bank is the only Australian bank to offer ecash — anonymous digital money which is validity-checked online by the corresponding financial institution.

Other banks won't bother with ecash now that smart cards are just around the corner. Once there is a plug-in device on PCs, you will be able to download cash onto a smart card from your bank account over the Net. "The technology already exists, and it's working. It's just a matter of getting consumers online," said Rondot. ■

From saving yourself a trudge to the bank to actually lodging tax return forms from your PC, ebanking for business is just around the corner — somewhere.

Ebanking for ecommerce

Every afternoon as 4pm approaches, somebody, somewhere in your workplace probably walks out the door, down the street and into the queue at the bank before its doors close, lugging the day's banking documents, a pile of cheques and probably a bit of cash. The queue is always long and the tellers just want to go home.

It's not a fun task — exactly the kind of thing that's crying out for the electronic treatment. The same goes for all your other business banking. Committing transactions to the online environment really does save time and paperwork.

It would benefit the bank, too. Rather than pushing tired tellers beyond closing time (which is said to cost about \$1.60 per transaction), large scale Internet transactions may cost the institution as little as 10 cents each. From a business

'online' to the bank's internal network. The other version is dial-up modem banking, which doesn't directly involve the Internet, such as those offered to businesses by the National Australia Bank (NAB) and CBA.

But if events in the US are anything to go by, true Internet banking for business is on its way to Australia. So far we've seen a few successful proprietary efforts, but it will be less than a year before the majority of financial institutions offer something more than their current crop of online information libraries and customer input forms.

The integration of Advance Bank's system with St George's upcoming browser-based Web banking initiative is a bold step towards the sort of online banking most Internet-literate customers would expect. Leading corporate services provider Macquarie Bank recently began offering a browser-based 'Active Banking' service with basic statement and transfer facilities to a limited number of users, yet this still required dialling into a private non-Internet network.

Several banks began taking home loan applications over the Web in 1997, and have now extended this service to other forms of borrowing. CBA claims a response time of four hours (for applications received during working hours), and offers an excellent Business Centre on its site. Here you can apply to open an account, fill out a business loan application of any type, get approval for an overdraft, or simply request that a bank representative contact you. There's also an advice briefs database to answer common business banking questions.

Using software like Quicken, a small business in the US can potentially manage its finances across multiple accounts with different banks at the same time, paying bills and tracking income. At present this is not a reality for Australians — for example, our version of Microsoft Money sadly ships with the online banking system 'greyed out' and unusable (see page 84).

It's still a good idea to look at the Microsoft and Intuit Web sites to get an idea of the broad possibilities. Quicken



point of view, the Internet brings bank access to more potential customers and provides a 24-hour shopfront — it also provides a challenge to traditional banks, in that non or near-banks may find it relatively easy to offer services online which would be hard to bring to a mass market elsewhere.

Unfortunately, there's really not much of this going on in Australia yet. For a few years, the word 'online' has been abused in the financial sector — an 'online banking service' generally constitutes a telephone service where you can talk to a teller whose computer is

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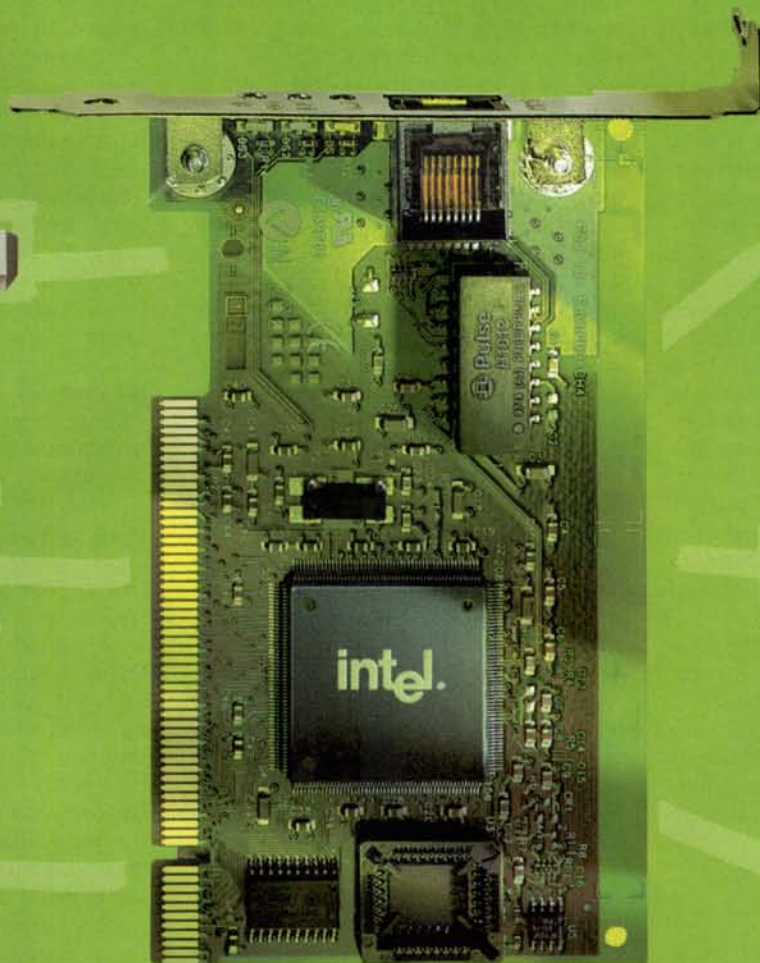
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.com has a wealth of information and advice for small business, and is open to anyone. It's worth checking out whether or not you intend to use Intuit's software. Accounting software suited to larger businesses will, of course, be slower to move to online operations. Lower-end products are the proving ground, and it is taking some time for confidence in online banking security to grow. Current high-end solutions are more likely to be capable of communicating directly with your bank (if the bank can reciprocate) than to use the Internet in any way. At the top level of the financial software market, it pays to be conservative.

General Internet integration in accounting products is growing, however. For example, AccPac's Simply Accounting 6.0 allows shipment tracking via the Web and can add purchase orders and invoices to your email. Secure online access to accounting information is possible through AccPac's Accounting server, which ships with a suite of Java or ActiveX applets. Similarly, Platinum Software's Internet Object Server added to Platinum SQL allows secure access to financial data across the Net.

The bottom line is that while your bank and software companies may want you to commit online, it's not sensible to go with Internet banking solely for convenience when your day-to-day business is directly affected. There must be significant benefits involved — and they're almost here.

Tax haven

Despite the temptation to place extra taxes on ecommerce, which the US Government predicts will be turning over \$US300 billion by 2002, President Bill

Clinton wants to spur economic growth by making the Internet a global free-trade zone. The US is working towards international agreements in this vein, having already convinced the European Union (EU). The proposed model would make online transactions free of government charges worldwide, a significant benefit no organisation can ignore.

Around the time you read this, Clinton will be meeting with leaders of the G7 (Group of Seven) nations in Europe and is expected to take time out to attend a high-level meeting of the World Trade Organisation in Geneva. These meetings will determine the success of his campaign, which is seen by some to benefit the US far more than the rest of the world (due to the amount of Internet activity based in the US) — look for the results on apcmag.com.

Global financial institutions like Visa and MasterCard are pushing for the adoption of concepts like the SET (Secure Electronic Transactions) payment system in Clinton's free marketplace. By seamlessly exchanging secure digital certificates, SET allows online transactions to occur without the hassle of entering special secure Web sites and sending credit-card information through online forms.

If your business can exploit ecommerce and is aware of schemes like SET, perhaps it makes sense to integrate as much ebanking into the equation as possible once it arrives. Long term, if it is possible to have the books updated automatically in the same environment where business transactions and banking occur, it must be possible to reduce overheads.

But perhaps the transaction processing demands of ecommerce will require something more than is currently available, as the exchange of digital certificates in transactions increases. Both financial institutions and businesses will require ever more capable systems, and this is where higher end accounting software could be brought into play — in fact, some businesses may find it hard to jump into the ecommerce model until high-end software is specifically designed to accommodate it.

The SET specification, resulting from a 1996 agreement between Visa, MasterCard and software companies, relies on a number of 'certificates' — digital permission documents which verify the legitimacy of buyers and sellers to conduct a credit-card transaction behind the scenes. Cardholders' certificates contain the card number, expiry date, and so on, encoded with one-way encryption

(designed to be irreversible). Merchants' certificates on the server prove that the seller is an approved recipient of SET transactions. The result for each transaction is a 'digital signature' which cannot feasibly be cracked with today's technology. All those security worries are instantly overcome.

Ecommerce using a model like this requires certificate-issuing authorities (or 'trust centres') which are responsible for the integrity of transaction data and the authenticity of parties to a contract. This would seem a natural role for a bank, but the fact is, any organisation can gain authority to do this. As Price Waterhouse found in its April 1998 discussion paper on Internet banking, opportunities may exist for non-financial institutions in electronic banking as the same online storefront is available to anyone. Further information about becoming a certificate authority is available at <http://www.verisign.com>.

Other functions of ebanking

In early April, KPMG and the Australian Society of Corporate Treasurers released a report which concluded that Australian companies were not realising the benefits of electronic banking — although *The Australian Financial Review* reported that one in eight of the companies surveyed by KPMG and the ASCT had begun using electronic banking in the preceding year, two thirds of which were organisations with annual revenues below \$500 million.

Online share trading has taken off much faster than general money management. Stock market-related sites and online financial magazines are currently among the most popular places on the Web.

Another of the most convenient online possibilities is lodgement of tax forms. The Australian Taxation Office (ATO) offers proprietary software and downloadable forms of several types (employment declaration, tax file number queries, but notably excluding tax returns), though as yet these have to be printed out and snail-mailed back to the ATO.

Meanwhile back in the US, the Internal Revenue Service allows tax form lodgement online — known as 'e-filing' — via several third-party off-the-shelf software products and Web sites.

And when does our own ATO expect to offer true online lodgement? You guessed it... 'very soon'.

Simon Vandore

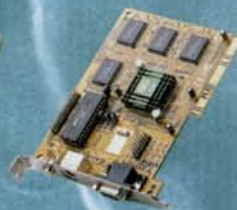
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Finding the right business and accounting package is a matter of defining your needs and seeking expert advice. By Mike Bridges

We can work it out

Accounting software isn't usually classed by users as particularly exciting. These programs are invariably text-based, and primarily deal with assets and liabilities and the changing fortunes of both. The market has matured, however, so that the software available today generally has a strong track record, with good fee-based support and many reference sites in the majority of market sectors.

Programs like Intuit Quicken and Microsoft Money are often now termed 'personal finance software', and have Windows features that make them easy to learn and use. Personal finance applications, and even some SOHO products built on the cashbook, or single-entry, model, usually retail for less than \$100, and offer some integration with other Windows applications such as Word and Excel.

The majority of these products use the single-entry method of keeping accounts. This makes it easy to 'post' a transaction, whether a cheque, credit-card payment or deposit, from one of various income streams. As personal finance applications, they represent good value and are an appropriate way for individuals to track their personal financial position.

Problems arise, however, when these single-entry products are promoted as being suitable for business use. While they may run a SOHO or smaller business quite well — providing up-to-date information on the bank account balance and the financial position of a business — they are open to user error or abuse.

This is because the first principle of accounting is 'double entry', a method invented in the 16th century which ensures that for every transaction posted to one side of the ledger, there's a corresponding and equal transaction posted to the other side of the ledger. Proper accounting software must provide an audit trail.

If your manual or computerised system doesn't provide a proper audit trail, then the Australian Taxation Office



(ATO) has every right to ask you to re-enter your data into an approved system or to redo the work manually. You may even be required to enter or redo the past seven years' transactions. If you're unable to provide a proper audit trail for the ATO's perusal, then it can be done for you at commercial data-entry rates, which may be added to your fine.

So, while many personal finance packages are widely used by SOHO and smaller businesses, wise business people will use an accredited double-entry product and hence avoid mistakes or the potential for fraud. The message here is to check with the supplier about whether their product provides double-entry accounting. A genuine general ledger with a definable chart of accounts also distinguishes small business products like MYOB and SBA 2000 from personal finance products.

Apart from double-entry capabilities, small business software generally incorporates accounts receivable (debtors),

accounts payable (creditors), inventory control (stock), sales order entry (invoicing), general ledger and possibly job costing and/or payroll. It may have multiuser functionality, generally to a maximum of three or so users.

Further up the scale is mid-range or high-end accounting software, which has all the features of the small business packages and will incorporate things such as multi-company consolidation, multi-currency conversion and serial number tracking. It is distinguished by its ease of use, suitability to specific tasks, support levels, reference sites and a host of other criteria. These systems are priced in the vicinity of \$5,000 to \$100,000.

On the following pages are some comparative reviews of small business accounting software, along with a discussion of mid-range and high-end accounting software.

Comparative reviews of personal finance and small business software can be found on page 81.



ACCOUNTING FOR SMALL BUSINESS

MYOB Version 7

DATA-TECH

MYOB was launched in 1991 after local firm Data-Tech Software signed a republishing arrangement with the package's developer, US-based BestWare. Today, this off-the-shelf program is used by around 115,000 businesses in Australia.

The software comes on one CD-ROM or



four floppy disks. Installation is quick and easy; it took a little over one minute to install from CD and five minutes to install from floppy disk.

Each of MYOB's main functions — General Ledger, Cheque Book, Sales, Purchases, Inventory and Card File — are represented by icons in the Command Centre. An accompanying flowchart highlights

the activities involved within each function. This easy-to-follow interface is ideal for small business owners who may not be familiar with accounting procedures, as it details each process, step by step.

Each module also features the MYOB Analyst, which creates a range of instant reports. For example, within General Ledger you can immediately access the To Do list, a Balance Sheet, Profit and Loss Statement or Job Estimates, or make a number of Inquiries.

MYOB allows you to build your own chart of accounts, or base your accounts on one of 100 preformatted business models, such as the ones for an art gallery, barber, chiropractor, pet grooming service or photographer. While this is a worthwhile addition, the customisation is not as extensive as that offered by QuickBooks.

All templates, such as invoices and mailing labels, are customisable, although the process is not as simple as QuickBooks. However, MYOB's Reporting function is comprehensive, and can be easily

tailored to meet your information requirements and layout preference.

Data-Tech Software — which, incidentally, was the winner of the Telstra and Australian Government's 1996 Australian Small Business of the Year award — has established an extensive support infrastructure. It provides users with a 'Quality Consultant and Training Course Direc-



No Editor's Choice has been awarded in the small business accounting software category. This is not because we feel the products reviewed here aren't worthy, but because it wouldn't be fair to the products we weren't able to look at due to space restrictions. Although the exact number of available products in this category is a moving target depending on the criteria applied, at last count it looked to be over 100. With that in mind, this comparative review has instead attempted to give readers an insight into the product feature set(s) typically provided in this category.

tory' that lists over 120 consultants and 50 approved training courses throughout Australia. A variety of training courses is available, from half-day onsite training, to TAFE courses run over a semester. The package also comes with a 'Getting Started' video that guides new users through the installation and set-up process. The manuals and online help are first class, although we had little need to use them given the intuitive nature of the program.

Just as this article went to press, Data-Tech Software released Version 8 of MYOB, which the company claims will offer 30 enhancements including OfficeLink, which allows you to export information to Microsoft Excel and Word, and Corel WordPerfect. Another notable new feature is the ability to pay suppliers electronically; a feature available in more sophisticated programs for small businesses such as Sybiz Vision.

Data-Tech Software offers a smooth migration to more sophisticated programs for growing businesses. FirstAccounts (see review on page 82) is the entry-level product, followed by MYOB Accounting (which has an optional Payroll module for organisations with more than two employees). MYOB Premier Accounting is for multiuser accounting in small to medium enterprises.

- **Distributor** Data-Tech Software
- **Phone** (03) 9222 9777
- **Online** <http://www.datatech.com.au>
- **Price** \$399 (\$525 MYOB Accounting with Payroll)
- **In short** This off-the-shelf-package is a good

Considerations for small businesses

Many small business owners will be using an integrated accounting software package for the first time. Chartered accountant Richard Brown from Melbourne-based accounting firm Brown & Co offers this advice:

- Learn the basics of accounting before you transfer your accounts to a software package. While these packages can computerise your bookkeeping, only you can interpret the reports and analyse your financial position.
- Don't use extraneous reports just because they are available. You can waste valuable management hours on non-essential analysis.

- Ask your accountant how you should supply your company data at the end of the financial year. There are some things you could be doing now to streamline this process.
- Work with your accountant to ensure your computerised accounts are set up correctly. Don't wait until the end of the financial year to ensure you are recording the correct information.
- If you don't feel confident, consider initially using a bookkeeping service. Many services use the small business packages reviewed here and can update your accounts on a monthly basis for a modest fee.



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- Costing Codes
- Bill of Materials
- Foreign Currency
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- POS / Cash Register
- Document Designer
- Crystal Report Writer
- Quotations/Proformas
- Bank Reconciliation

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choice for growing businesses. Its smooth migration path to MYOB Premier Accounting ensures your investment — in time, money and procedures — is protected.

QuickBooks Pro

INTUIT

QuickBooks Pro is ideal for the lower end of the small business market. Around 65% of its users have annual revenues under \$500,000. The off-the-shelf package was developed by Intuit in the US, and was released in Australia in 1993 after modifications and localisation by Intuit Australia. In the last five years, around 50,000 copies have been sold locally.

QuickBooks Pro has six main areas:



Sales and Customers, Purchases and Suppliers, Cheques and Credit Cards, Time and Employees, Taxes and Accountant, and Company. Features not required can be 'hidden' during installation, so users are only presented with functions they use. On setup, you can customise your installation according to one of 22 business types, ranging from construction and contracting through to real estate brokerages. While it provides fewer industry options than MYOB's 100, it offers more sophisticated customisation.

QuickBooks Navigator, the opening screen, is a starting point for finding the various modules, forms, registers and reports. Clicking on each area produces a flowchart with icons showing the steps in the process, making it ideal for those with little book-keeping or accounting experience. This makes QuickBooks Pro one of the easiest small business accounting packages to use.

Forms such as invoices, purchase orders and statements can be easily customised

using the Layout Designer, and a range of stationery with your company logo pre-printed can be ordered through an authorised Intuit stationer.

The reporting function is extensive and comparable to that of MYOB although, as you would expect, not as comprehensive as Vision Lite. Users can undertake minor customisation to the layout and parameters. Unlike MYOB, which is limited (however generously) to 32,760 transactions, QuickBooks Pro has no limit on the number of transactions you can post in one year.

Intuit Australia offers a migration path for growing small businesses from the entry-level Quicken (see page 84) through to QuickBooks and on to QuickBooks Pro with Payroll. Converting data to a more sophisticated version is relatively simple, although several adjustments will inevitably be required.

Local distributor Reckon Software (a sister company of Intuit Australia) has established an extensive training and support infrastructure with a network of 1,200 accredited trainers Australia-wide. It also offers free telephone support for the first 30 days via a toll-free number. For ongoing support you can pay \$30 per incident, or for an annual fee of \$200 you can join the Premium Support Program, which provides

unlimited technical support via a toll-free hotline.

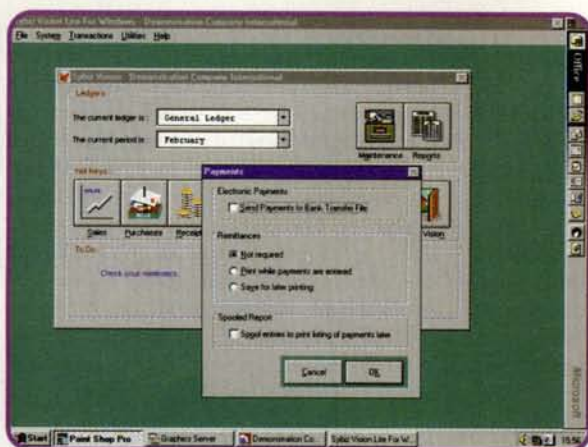
- | | |
|----------------------|--|
| ■ Distributor | Reckon Software |
| ■ Phone | (02) 9562 7411 |
| ■ Online | http://www.reckon.com.au |
| ■ Price | \$449; \$499 with Payroll |
| ■ In short | This easy-to-use package has everything the first-time small business owner would need in an off-the-shelf accounting package. |

Sybiz Vision Lite

SYBIZ

Australian-owned company Sybiz Software has been developing financial software since 1977, specialising in mid-range accounting and payroll systems. In 1996, it launched a small-business version of its flagship product Sybiz Vision. Vision Lite has 1,000 users in Australia, and distribution in other countries is just beginning.

Vision Lite has four standard modules:



General Ledger, Creditors/Purchases, Inventory/Stock Control and Debtors/Sales. It is available in either a single or three-user version. Optional modules include Point of Sale for small retail businesses, and Job Costing for the service industry.

This package has been stripped down for small business, rather than built for this market from the ground up. Unlike the other two packages reviewed here, it is not an off-the-shelf program; it is suited to the higher end of the small business category and assumes a basic understanding of accounting. Therefore, Vision Lite may be intimidating for small business owners, particularly those with no accounting experience.

Sybiz Vision Lite comes on nine floppy disks (it is not available on CD-ROM) and took 11 minutes to install. Once it is loaded, you are presented with the Main Selection Window — a series of 'hotkeys' or shortcuts to the most commonly used transactions such as Sales, Purchases, Receipts, Payments and Reminders. Maintenance and Report icons are available for each transaction. While custom-designed reports cannot be added, the existing reporting function is

extensive and should provide users with the information they require.

Vision Lite has a standard Statement and Invoice form, although most users will use the Forms Editor to design forms to suit their own stationery requirements. Data can be exported to various spreadsheet packages including Excel, Visicalc, Symphony and Lotus for flexible reporting and forecasting. In addition, transactions can be exported to Ceedata and Solution 6 — two accounting packages popular with accountants.

Sybiz recently signed an agreement with Drake to deliver training courses for its top-end package, Vision. Training programs for Vision Lite are currently under development. In the interim, training for Lite is available directly from the reseller channel. Unlimited telephone support contracts are available for \$500 per year.

This product has much to offer small businesses fast approaching the medium-sized category. As its \$1,750 price tag suggests, Vision Lite offers more sophisticated accounting features than the two off-the-shelf packages reviewed here.

Cathie Kennedy

- **Distributor** Sybiz
- **Phone** 1800 683 783
- **Online** <http://www.sybiz.com.au>
- **Price** \$1,750 (single user)
- **In short** A full-function package for small to medium businesses. Ideal for a rapidly expanding small business that has outgrown off-the-shelf packages such as MYOB and QuickBooks.



MID-RANGE AND HIGH-END ACCOUNTING SOFTWARE

Unfortunately, the selection and upgrade of accounting and financial software is seen as an overhead, and as a consequence is often assigned the lowest priority. Yet this is the 'engine room' of any enterprise, providing the primary methodology to analyse past performance and project future financial goals. Because of the initial and ongoing costs, managers tend to forget the very real benefits of modern accounting and financial solutions, and the fact that they can provide a true competitive edge.

All products in both mid-range and high-end categories are generally true Windows accounting and financial applications with a large user base across a variety of industries. As a rule they are modular and well supported by both the vendors and their reseller channels. Third-party developers can customise certain aspects of the application modules and/or add specific functionality.

For further details on products and their suitability to various industry sectors, readers are urged to check out the relevant Web site for each vendor (see page 115).

The multiuser factor

Mid-range and high-end accounting software is distinguished by its multiuser functionality and by having greater sophistication than either the personal finance or small business products. In fact, many small businesses should invest in a mid-range product solely because of the greater functionality that is available. A good example is Sybiz Vision Lite, which, although it is suitable for only one to three users, offers superior reporting and analy-

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sis features to those of any small business product, and can be upgraded to Sybiz Vision.

'Multiuser' means that two or more users can access the same function or module simultaneously. A product that only lets two or more users access different modules — for example, one person can access invoicing while another is in payroll — is not a multiuser system, regardless of claims to the contrary.

Lower-end products also lack the range of third-party developers for customising applications or providing add-ons, which means that reporting is limited to what's offered with the application. With accounting and financial software, price matches performance, and few multiuser applications are available for under \$1,000. Many have tried to break this barrier, but the ongoing costs of product development, marketing and support strongly promote a 'per module' and 'per user' price structure.

Mid-range accounting products also use different database technologies. While personal finance and small business products use proprietary database structures, mid-range and high-end products use 'industry-standard' databases such as FoxPro or Access to enable better integration with other Windows applications.

High-end accounting/financial applications are increasingly using industry-standard relational database technologies

OLAP technologies to better integrate the accounting system into a business's overall IT structure. The technology required to enable three, five or 10 users is much the same as that required for 20 or 60 users.

While most companies invest in mid-range or high-end accounting applications to satisfy a need for multiuser access, the true benefits lie in the 'financials' these products offer. This includes sophisticated budgeting, various forms of management and exception reporting, and superior module analyses and user-defined reporting.

While these products include all the previously mentioned accounting modules, such as Accounts Receivable, Inventory Control and General Ledger, each module is far more sophisticated, and the various feature sets within specific modules define the product's suitability for its intended use.

Platforms of choice

Multiuser products invariably run on client/server architectures such as Windows NT 4.0 Server or Novell NetWare, and usually have an Ethernet backbone under IPX or, more recently, TCP/IP. While the definition of client/server is flexible, it usually suggests that the data, and often the application, is centralised on a dedicated machine (the file server). Individual users access specific modules, subject to their permissions from a PC defined as the 'workstation'.

The server controls all access to the product's database(s) and provides network administration, system management, security, backup and perhaps some processing activities. Mid-range accounting software usually caters for between five and 60 or so users, and runs on a single file server with each workstation running its own specific application or subroutine. Higher-end accounting applications can usually take advantage of multi-processor and/or multiple PC server environments.

An example of the latter is Platinum Software for Windows (SQL) which can 'split' the workload so that processor-intensive routines such as posting or reports are run on their own 'application server', rather than on the originating workstation. The workloads are 'queued' to one or more application servers and the results are returned on completion to the respective workstations for further processing.

Common features

Both mid-range (five to 60 users) and high-end (25 to 200 users) accounting/financial products usually offer a range of comprehensive 'modules' for debtors, creditors, stock control (usually with bill of materials and serial number tracking), sales order entry (invoicing), cashbook and general ledger functions.

General ledger posting may be 'dynamic', 'batched', or a mix thereof. While dynamic general ledger update is offered as a feature in single-user products, there are very valid reasons for batching the general ledger postings, and dynamic updates aren't always desirable in larger enterprises.

Additional features such as multi-currency conversion, serial number tracking within 'kits', telemarketing and point-of-sale (POS) modules are generally also available — either as native modules or third-party products. Often third-party, industry-specific modules developed for other users can be further customised and offer suitable functionality.

Individual module reporting may be internal, or more likely via a specialist report writer, usually Crystal Reports or similar. This allows users to consolidate reports from disparate data sources — including accounting applications, spreadsheets and other databases — into one or more reports, with the ability to subtotal at user-defined breakpoints.

Traditional applications that have a history of successful multiuser accounting software — from vendors such as Attaché, Arrow, CBA and Sybiz — are a good place to start looking for mid-range solutions. However, many higher-end software vendors also provide mid-range alternatives. Great Plains Software and Platinum Software, for instance, are two vendors that have migrated their product line across and down to cater for smaller users.

Hence, what was once reasonably clearly defined territory is now awash with local and international vendors which have upgraded and/or modified their applications to suit specific market segments, address general accounting demands and prolong product life cycles. International vendors have customised their applications to be country-specific by adding or turning off functional components such as VAT or GST options.

Mid-range decision criteria

Considering a multiuser accounting platform requires professional advice, whether



— notably Microsoft's SQL Server and Sybase — for the same reasons that even higher-end products like Oracle Financials are based on various minicomputer and mainframe database structures.

Other benefits of both mid-range and high-end products include superior reporting options, often via a third-party specialist report writer like Seagate's Crystal Reports. Additionally, they usually provide Microsoft's DDE, OLE, ODBC and

inhouse or external. Selecting a product requires assessment of the business's existing and projected accounting, financial, integration, reporting and support requirements.

Verify all reference sites supplied by each vendor and ensure they are sites operating within your industry or market sector. Terms like 'value for money' have little application here because you're looking for a long-term partnership with the chosen vendor, and much of what you'll get is determined by the contract you negotiate. Cost is a major factor — both initial and ongoing — as is the total cost of ownership (TCO) as amortised over the life of your software, which is usually measured at 10 years.

Hardware upgrades and/or replacements are generally required and Pentium workstations for Windows 95 benefit the local processor-intensive application sub-routines such as posting and reporting. If you're never likely to exceed 25 users, including office application users, then Microsoft's BackOffice Small Business Server is an ideal choice.

If you already use Novell's NetWare 3.12 network operating system (NOS), then upgrade to either NetWare 4.11 or Windows NT 4.0 Server. If you use Artisoft LANtastic in any form, replace it. If you have a 'peer' network such as Windows for Workgroups 3.11 or Windows 95, then you will need a dedicated NOS such as Microsoft Windows NT 4.0 Server or Novell NetWare 4.11 to run the multi-user accounting application.

Users moving to a multiuser accounting platform for the first time usually face an initial cost of three to five times that of the actual software to cover system 'cut-over' and the first year's training and support costs. These additional

costs are generated by the need to upgrade or replace computer hardware, upgrade other software applications, associated training fees, initial data-entry costs including verifying and bringing forward the opening balances, and general business dislocation as users become familiar with the new systems.

System and network security is additional and should include network system

implementation and support is recommended.

High-end solutions

Having more than 60 users places greater demands on the technology because the 'transaction processing' factor becomes more critical. All accounting applications are required to handle data capture, transaction processing and reporting. The first and last elements are straightforward, and are handled quite easily by most relational databases.

Online transaction processing (OLTP) refers to high-volume transaction posting, for example sales inquiries, quotations, invoices and payments. This demands a more robust relational database structure, including specific database tools, transaction methodologies and business rules.

These higher-end PC applications may still use a proprietary database structure, but more often are integrated with

Microsoft's SQL Server as the main database engine. This is a logical progression, emulating Oracle Financials and other minicomputer and mainframe products like SAP R/3 and various Informix, Ingres and Sybase applications.

Users moving to a higher-end solution are usually already familiar with the intricacies of multiuser, networked accounting software and are upgrading either because of additional performance requirements (slow response times, more users required and the like) or the need for improved or increased financial functionality.

Type	Account Number	CR	Debit	Amount	Description	Period 1 Jan 31, 95	Period 2 Feb 28, 95	Period 3 Mar 31, 95
1					Sales Forecast			
2	4000-100-HOME				La Hardware	544,230	852,150	888,190
3	4000-100-SFWE				La Software	520,000	860,000	848,570
4	4000-200-HOME				Collec Hardware	1,159,000	1,398,400	2,056,000
5	4000-200-SFWE				Collec Software	758,840	1,000,500	1,482,080
6					COGS %			
7					La Hardware	10,000	10,000	10,000
8					La Software	0.75	0.75	0.75
9					Collec Hardware	0.80	0.80	0.80
10					Collec Software	0.70	0.70	0.70
11					Collec Software	0.80	0.80	0.80
12					Cost of Sales			
13	5000-100-HOME				La Hardware	408,170	494,360	513,950
14	5000-100-SFWE				La Software	414,250	494,300	524,490
15	5000-200-HOME				Collec Hardware	811,240	998,400	1,482,080
16	5000-200-SFWE				Collec Software	570,130	758,840	1,000,500

support, backup and data warehousing procedures, and antivirus strategies. Users should look for a 'per user' by 'per module' cost structure for software to ensure that they have the right mix of application modules aligned with respective users. Support is the major end-user requirement — both for the network and all applications.

Comprehensive support needs to be cross-guaranteed by the software vendor and those responsible for implementing the complete system. A single agreement nominating a 'prime contractor' who is solely responsible for all facets of system

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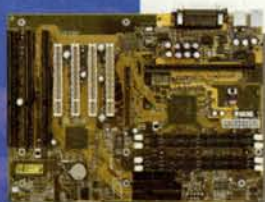
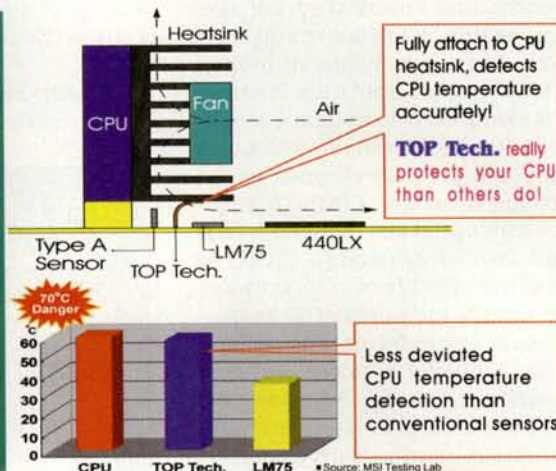
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- Memory: 4 DIMM, Max. 512MB, or 1GB registered SDRAM (Support ECC)
- I/O: 2 Serial, 1 Printer, 2 USB ports, Floppy, IrDA (register)
- BIOS: ACPI, DMI, PnP, Green
- Slot: 3 ISA, 4 PCI and 1 AGP. 30cmx22.5cm, ATX



MS-6119

Intel® 440BX AGPset ATX Mainboard

- CPU: Intel Pentium® II processor up to 450MHz or faster
- Memory: 3 DIMM, Max. 384MB, or 768MB registered SDRAM (Support ECC)
- I/O: 2 Serial, 1 Printer, 2 USB ports, Floppy, IrDA (register)
- BIOS: ACPI, DMI, PnP, Green
- Slot: 3 ISA, 4 PCI and 1 AGP. 30cmx18.6cm, ATX



MS-6120

Intel® 440BX AGPset ATX Mainboard

- CPU: Dual Intel Pentium® II processor up to 450MHz
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- SCSI: Adaptec® 7895 Chipset. Provide 2 Ultra Wide SCSI & 1 Ultra SCSI connectors. Transfer rate up to 40MB/s
- I/O: 2 Serial, 1 Printer, 2 USB ports, Floppy, IrDA
- BIOS: ACPI, DMI, PnP, Green
- Slot: 2 ISA, 5 PCI and 1 AGP. 30cmx25cm, ATX

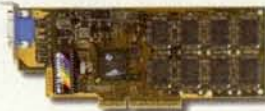
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- Support OpenGL ICD spec.
- Geometry processor enhance 3D performance
- Support ACPI, Fully Microsoft PC98 compliant
- Polygon-based with 2 buffer



MS-4413

3Dlabs PERMEDIA®2

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- Polygon-based with Z buffer
- Support ACPI, Fully Microsoft PC98 compliant
- Support OpenGL ICD spec.
- Support NLX/ATX form factor



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GAME-EXE, Russia
January, 1998



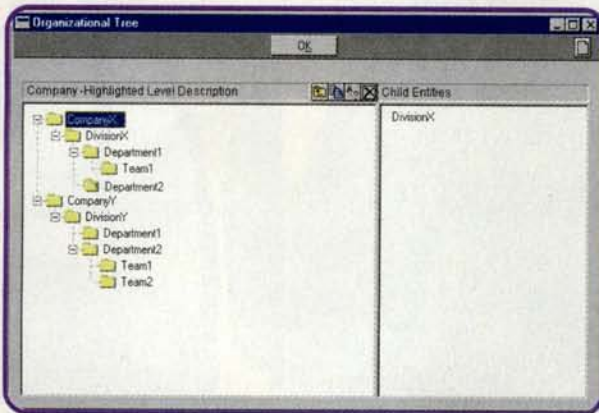
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These products generally satisfy the majority of businesses with between 50 and 200 users. Beyond 150 or so users, firms need to seriously consider the scalability of their existing applications, and may need to move to non-PC solutions such as BPCS or Oracle Financials running on an IBM AS/400.



Higher-end accounting and financial solutions rely more on the use of business 'rules' in defining the database functionality. Naturally, all products in these categories are warranted by their vendors to be fully year 2000 compliant. Multi-company, multidivisional consolidation is the norm, and the asset register and depreciation scheduling are fully integrated and in line with current compliance requirements.

Higher-end products like Platinum SQL and Great Plains Dynamics C/S+ normally support a higher set of software development tool sets for system customisation, and they integrate with Microsoft SQL Server and other Windows applications. In effect, their database is SQL Server, in the same way Oracle

Financials is built on the Oracle database structures. Consequently, Microsoft BackOffice is the underlying structure.

Although proprietary data structures are available in the higher-end products, the use of SQL Server represents a better return on investment, as the implementation of a SQL Server environment is usually quicker in terms of cut-over, training and system management. Users are generally familiar with networking requirements, system demands, methodologies and business/networking rules.

Summary

It's hard to find a 'bad' multiuser accounting product these days. The lower-end products that still rely on their DOS

architecture come closest in terms of slower performance, minimal integration with other Windows applications and limited scalability.

As with many things in this life, you get almost exactly what you pay for — the market is too competitive for anything else. Therefore, the product selection criteria are paramount and scalability is an important factor. We have not mentioned Electronic Data Interchange or Internet functionality here, for the simple reason that while these functions are important and growing more so, the Internet is yet to satisfy all parties as to its security for transmitting financial transactions.

Even assuming this security is satisfied, only the higher-end products have

Suppliers

Multiuser PC accounting software (five to 200 users):

ACCPAC — Tel: (02) 9906 3666;
Fax: (02) 9906 3665;
Online: <http://www.accpac.com>

APTOS — Tel: (02) 9923 1311;
Fax: (02) 9923 2572;
Online: <http://www.walker.com>

Arrow Research — Tel: (02) 9955 0999;
Fax: (02) 9955 0350;
Online: <http://www.arrow.net.au>

Attaché Software Australia —
Tel: 133 045, Fax: 1800 659 301;
Online: attache@msn.com

CBA/Jade — Tel: (07) 5476 9737;
Fax: (07) 5476 9942

Great Plains Software — Tel: (02) 9900 3000, Fax: (02) 9956 6580;
Online: <http://www.gps.com>

Platinum Software — Tel: (02) 9956 6166; Fax: (02) 9956 8976;
Online: <http://www.platsoft.com>

Sybiz Software — Tel: (02) 9954 5211;
Fax: (02) 9954 5240;
Online: <http://www.sybiz.com.au>

any hope of handling the high OLTP overhead imposed on implementing electronic commerce functionality. As products grow to embrace more sophisticated database engines — Platinum SQL on Sybase, for example — ecommerce becomes more feasible. But that's a whole other story.

Mike Bridges

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For the road warrior looking for a sturdy performer and powerful battery, our business machines from Acer, Dell, Digital, Gateway, IBM, NEC, Pearl, Toshiba and Twinhead will get you working away from the office in no time.

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Is a notebook the answer to your mobile dreams? APC Labs brings 30 notebooks under the microscope to sort the great from the not-so-great. By Roulla Yiacoumi

Mobile madness

Are you in the market for a notebook? If so, you're not the only one. In 1997, 245,000 of these little machines were sold in Australia, and the figure for 1998 is expected to come in even higher.

Our fascination with notebooks continues to drive a competitive worldwide mobile trade. In this feature, we sort through the madness to bring you the best notebooks on the Australian market, whether you are looking for a cheap and basic notebook to get the job done, or a powerful top-of-the-line unit.

We invited all local notebook vendors to participate in our feature. Of the 10 most successful notebook vendors in the country, Compaq and Hewlett-Packard did not wish to submit machines. Other vendors which declined our invitation were Fujitsu, Samsung, Sharp, Canon, Siemens-Nixdorf, Teco, Micro-Pro and Oris. Vendors may have declined to participate as they did not have an evaluation model available, were in the process of releasing new models, or simply did not wish to include their notebook in a comparative review.

We invited vendors to submit one unit per category. There were minimum requirements for the notebooks to meet in each field (all notebooks had to ship with Windows 95), however some vendors failed to acknowledge these and submitted substandard machines. The effects of this are evident in our test results.

Notebooks under \$4,000

Our only requirements in this category were that the notebooks have a minimum 32M of RAM and, of course, retail for under \$4,000. We had some excellent, inexpensive machines that passed our APC Labs testing procedures with flying

colours, and a number of machines came in well under the price limit we set. Six of the nine machines retailed for less than \$3,800, and a few were closer to \$3,000 than \$4,000.

But price isn't everything — we also considered the features and the performance of each machine, including the battery life. Only one machine was submitted with a Pentium 133MHz MMX processor; the others used at least a Pentium 166MHz MMX CPU or faster. Two machines sported Pentium 233MHz MMX processors, but these performed weakly on the battery front.

All notebooks featured a 12.1in display — four of these were active matrix TFT. Dual or high scan are still the more popular options when it comes to keeping the cost of the machine to a minimum.

Soundcards were featured on all notebooks, and only one machine did not have a CD-ROM drive.

Business machines

We required a sturdy machine designed with the road warrior in mind for this category. We were looking for a viable battery life, a comfortable carry weight, ease of handling, and a solid warranty.

Vendors were asked to submit notebooks with at least a Pentium 133MHz MMX processor, 32M of RAM, a CD-ROM drive and an active matrix TFT display. The nine machines ranged in price from \$3,620 to \$6,945.

A Pentium 150MHz MMX processor was the slowest of the bunch, while the majority of vendors opted for a Pentium 200MHz or 233MHz MMX CPU.

In this category more than any other we saw some phenomenal battery results, perhaps for the first time giving mobile users reason to hope that notebooks can last more than just a couple of hours on the road.

Slimline

Weight was the name of the game in this category, but we also looked at the thickness and general size of the notebook. We examined the features packed into these small units relative to their price and checked whether, in the endeavour of having everything smaller, battery life had been compromised.

We asked for machines using at least a Pentium 133MHz MMX processor, 32M of RAM, a CD-ROM drive and an active matrix TFT display.

Only five machines were received in this category, starting at just over \$4,000. Three of the notebooks used a Pentium 166MHz MMX processor, while the other two used a faster chip.

Overall, performance was not great. This category produced test and battery results which were comparable to our cheap, under-\$4,000 category. The catch is that these slimline machines cost a lot more, but may not provide the weight advantages you'd expect. You will need to consider the performance trade-offs in buying a slim, light notebook.

Power rush

This is where the serious notebook users should be looking — powerful machines with fast processors, large screens, long-lasting batteries and extras such as DVD-ROM drives and modems.

Vendors were asked to submit units with at least a Pentium 266MHz MMX processor, using 64M of RAM, a CD-ROM drive and an active matrix TFT display. Two of the six machines employed Intel's latest Pentium II 266MHz processor and yet were among the least expensive of the machines. Prices in this group ranged from \$5,539 to \$10,305.

As expected, these machines produced

the best test results of all categories, however the heftier processors clearly required more power. So while battery life was quite good, it was just a little lacking next to the results produced by the business machines.

State of play

According to IDC Australia, about 20,000 more notebooks will be sold this year than last year. Bernie Esner, senior analyst for PCs, said that 1998 will be a "pinnacle" year for notebooks, and estimates that some 267,000 machines will be sold across the country.

Toshiba continues to dominate the local market, and has a whopping 31.8% share. At APC Labs, we have not seen an innovative or strong-performing Toshiba notebook for some time. Vendors such as IBM have been faster to incorporate new technologies such as 14.1in displays and DVD-ROM drives. When IBM first released its ThinkPad 770 with its huge 14.1in display, Toshiba told us its customers did not feel screen size was a major consideration and thus had no plans to release a model with such a display. According to Esner, Toshiba has a good hold on the NSW education market.

Compaq, holding a 9.5% market share, is up there in the number-two position, but we have not seen a brilliant Compaq notebook for some time either. The last time we saw a Compaq unit was in a comparative review in our January 1998 Tillamook feature. The Compaq Armada 7770DMT ranked last in almost half the tests, and yet was one of the most expensive machines. This time around, Compaq declined to participate.

IBM has been putting a lot of thought and effort into producing its ThinkPad notebook range, an excellent collection of sturdy, capable machines which the market has really taken to. IBM's notebook share in 1997 was up 7% (or 5,000 units) from the previous year. Unfortunately, in this roundup we had to withdraw the IBM ThinkPad 310, which was submitted to our under-\$4,000 category, as it was unfit for testing. Two of the other notebooks came in with incorrect specifications, and so performed poorly against the competition. The last notebook met the correct minimum requirements, but used the slowest processor of the bunch, and again made a poor showing.

NEC has made a strong push for the education market in Victoria, and is the

fourth most successful notebook vendor in Australia with an overall share of 7.2%. In this review, we found that although the NEC notebooks were good performers, they cost too much — much more than comparable machines. A little more aggressive pricing from NEC may make them a more viable solution for buyers.

When **Acer** told us its chief concern was the battery life of a notebook and that all efforts were being directed to producing a long-life battery using advanced power management techniques, it sounded like marketing fluff to us. After all, we hear such promises from vendors on a regular basis, and they don't always amount to much. But a year later, it seems Acer has achieved what it set out to do: it has produced good, affordable notebooks with excellent battery-life results. The hard work is now paying off.

Some people may be surprised to see **Apple** holding a confident 6.8% share of the notebook market, in sixth posi-

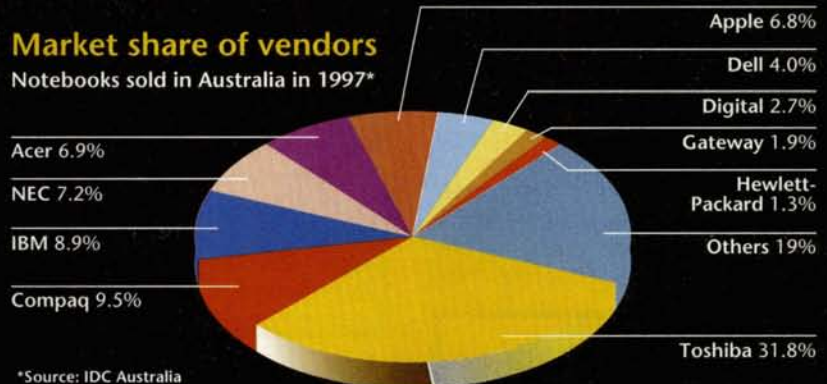
tioned well in APC Labs. They produce good results and are solid workhorses, but are perhaps a little expensive. In 1997, Digital had 2.7% of the market.

Hewlett-Packard holds 10th spot with a 1.3% share. Although HP declined to submit units for this feature, it is usually keen to participate and its machines normally do reasonably well, even if they are a little pricey.

What to expect

Just when we thought notebooks were getting smaller and lighter, yet better able to match a desktop in terms of performance and specifications (but definitely not price), vendors start incorporating heavy 14.1in screens, larger hard drives, and other components such as integrated modems, making some notebooks heavier than we have seen in a while. Are we going back to the 1980s, when notebooks were the size of briefcases?

Market share of vendors
Notebooks sold in Australia in 1997*



*Source: IDC Australia

tion right on Acer's heels. Esner said that although the company is experiencing woes, it has a loyal in-store base in both the graphical and education markets.

Dell, a fine producer of up-to-the-minute machines at bargain prices, has grabbed a 4% share, double that of its chief competitor **Gateway**. Both vendors rely on the direct build-to-order sales model in order to produce machines with the latest components. And no middleman means the machines are sold directly to the customer at much lower prices. While both vendors incorporate the latest components and produce high-performance machines, Gateway's market share is currently just 1.9%. Both vendors offer lifetime phone support on all notebooks sold.

Digital notebooks have always per-

The answer is that while we enjoy using notebooks for their portability, we also want the better specifications, even if they do add to the size and weight of the machine. A handheld PC may be a viable option for those who really only want something on which to do bits of work here and there (see APC May, page 113).

While handheld PCs such as those produced by HP, Toshiba and Philips are really taking off, Esner said these machines are great for ad hoc work, but not for producing long documents or for intricate projects. For this reason, notebooks will continue to dominate the market in which people on the move need to produce serious work on serious machines, without compromising on performance or features.

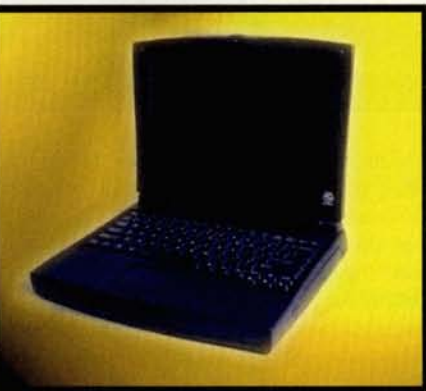
Notebooks under \$4,000

Extensa 390C

ACER

A notebook which came in way below the \$4,000 cut-off mark, the Acer Extensa 390C performed very well in our benchmark tests and pulled in a terrific battery result.

Using a Pentium 200MHz MMX processor with 48M of RAM and a 256K secondary cache, the Extensa 390C shared second place with the KTX 1000 in the Winstone 98 test with a score of 14, only just behind leader Mitac 5033 on 14.7. In the Business Disk WinMark 98, the Extensa 390C tripped and fell into fifth position but fought back in the High-End Disk WinMark to earn second position. Ahead of it was the Mitac 5033, which had a much faster 233MHz MMX processor and bigger hard drive (4G versus the Extensa's 2.1G). In the Business Graphics Win-



Mark 98, the Extensa ranked first on 77.2, with the Mitac 5033 a little behind on 70.9. The Extensa used a Chips and Technologies video-controller chip with 2M of EDO RAM.

But the Extensa 390C's best effort was saved for the battery test. Its result of four hours and 11 minutes was particularly impressive — even more so considering it

EDITOR'S CHOICE

● Acer Extensa 390C



Good value was the name of the game in this category, and the Extensa 390C proved a bargain at just \$3,199. Its overall performance was very good and with a battery life of four hours and 11 minutes, it was the best in its class. (For even better features and performance, be sure to also check out the Extensa 390CX in the business machines category, also priced at under \$4,000.)

The Mitac also pulled in some very impressive results — with the exception of its battery, which could barely last two hours. Although priced at \$800 more than the Extensa 390C, it has a faster processor, bigger hard drive and a better-quality screen.

was a NiMH battery. This result landed the Extensa 390C in top position and a good 30 minutes ahead of the next place-getter, the KTX 1000, which used a lithium ion battery.

On the downside, although the Extensa's screen was a 12.1in 'high scan', which is supposed to be better than dual scan but not as good as active matrix TFT, it lacked the clarity we expected. If we moved our pointer too fast it disappeared, but this is not uncommon with such displays.

While the Extensa 390C provided the best overall value in this field, you'd be better off paying the extra \$800 and getting the Extensa 390CX (as reviewed in the business machines category) with its better-quality active matrix TFT screen, bigger hard drive, longer-lasting battery and better overall performance.

Roulla Yiacomini

- **Distributor** Acer Computer
- **Phone** (02) 9870 1999
- **Price** \$3,199
- **Online** <http://www.acer.com.au>
- **In short** Cheap as chips with consistent performance and a great battery.

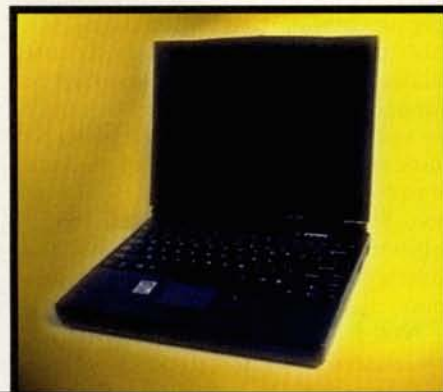
Solo 2300SE

GATEWAY

While we asked vendors to submit notebooks in this category with a minimum of 32M of RAM, Gateway submitted its Solo 2300 with just 16M and, as expected, suffered on the performance front.

The Solo 2300 crawled into last place in our Business Winstone 98 with a score of 6.5, about half the result of any other notebook in this category. Similarly, it occupied the final rung in both the Business Disk WinMark 98 and High-End Disk WinMark 98 tests, although it sat only fractionally behind the Leo DesignNote (see page 121) 5200 Cedar in both cases. It did a little better in the Business Graphics WinMark 98, with its NeoMagic MagicGraph 128XD, using 2M of EDO RAM, steering it to sixth position.

The Gateway Solo 2300 featured a Pentium 166MHz MMX processor and 2G hard drive. It was the only notebook in



the category not to include a CD-ROM drive, although an optional 20x is available for \$199. We were also disappointed to see this notebook is the only one shipping with Windows 95 backup on floppy disks.

Its 12.1in dual scan screen was one of the better ones we saw, with no fading or disappearing of the pointer when moved quickly. The NiMH battery life of two hours and 41 minutes was deemed reasonable, and the three-year warranty covering both parts and labour is very attractive.

Roulla Yiaccoumi

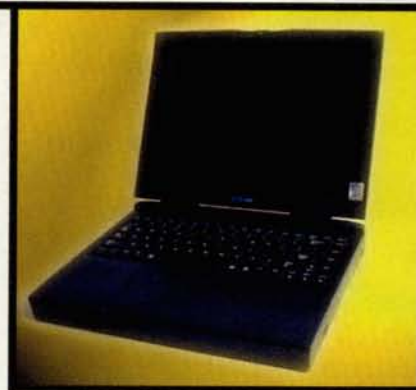
- **Distributor** Gateway
- **Phone** 1800 500 734
- **Price** \$2,999
- **Online** <http://www.gw2k.com.au>
- **In short** The cheapest notebook tested, but no CD-ROM drive, and you'll need extra RAM to improve performance.

KTX 1000

KTX

The Pentium 200MHz MMX-based KTX 1000 is one of two notebooks in its class with a 512K secondary cache, the performance gain of which can be seen in the CPUMark32 result of 421 (a higher score than the Mitac 5033 Pentium 233MHz MMX machine).

With a Business Disk WinMark 98 of 759.3, the 2G Hitachi hard disk drive wasn't slow either, ranking fourth. Similarly, the KTX 1000's Cirrus Logic video-controller chip driven by 2M EDO RAM per-



formed admirably in the benchmarks, with a Business Graphics WinMark 98 score of 70.6. The overall performance of the machine, reflected in a Business Winstone result of 14, placed it equal second with the Acer Extensa 390C.

However, good performance does not a notebook make. Replacing the notebook's battery proved a real challenge, as did swapping the floppy for a CD in the drive bay.

On the positive side, the KTX 1000 sports its status LEDs on the *front* of the machine as opposed to the stock standard rear placement. Given notebooks are often carried base up, this allows you to see the power and battery LEDs easily while carrying the machine.

With a 12.1in active matrix TFT screen, 32M of RAM, a bundled 20x CD-ROM, and a fairly long battery life of 3 hours and 38 minutes (second only to the aforementioned Acer Extensa 390C) the KTX 1000 offers very good performance with a price tag to match.

Ashton Mills

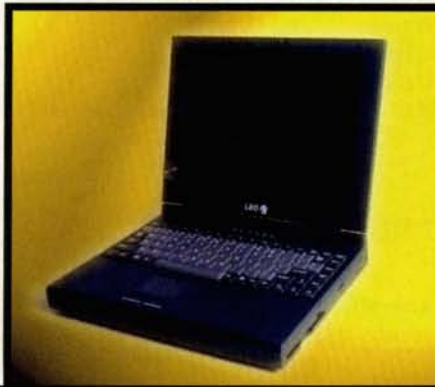
- **Distributor** Edge Technology
- **Phone** (02) 9353 9200
- **Price** \$4,000
- **Online** <http://www.edge.net.au>
- **In short** Save for a few annoying design flaws, the KTX 1000 packs as much power as \$4,000 can buy.

DesigNote 5200 Cedar

LEO

Despite sharing the lowest price tag (\$2,999) of the group with the Gateway Solo 2300SE, using an identical Pentium 166MHz MMX processor and outclassing that machine's memory allocation by 32M of RAM to 16M, the Leo DesigNote 5200 consistently came either last or second last in our benchmark rankings, often nudging out the Solo 2300SE by only very narrow margins.

Its 1.6G hard disk drive was also below par for the class, while its 256K secondary cache was in line with all its competitors — bar the NEC Discovery 713L and the



DIGITAL REVOLUTION

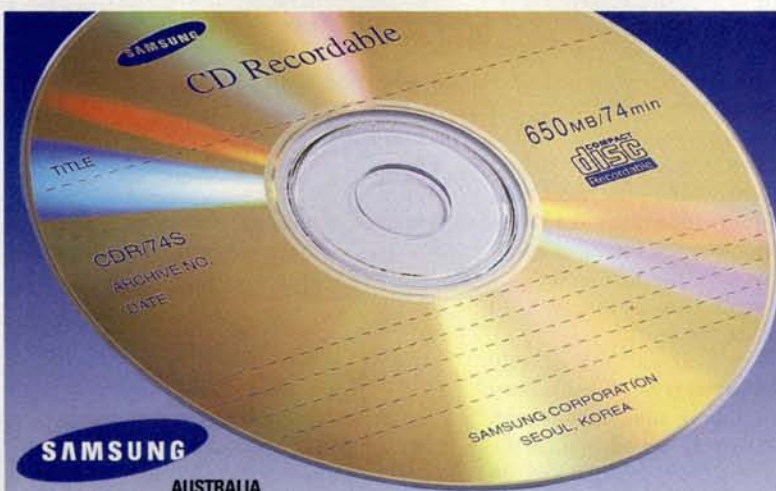
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KTX 1000, which came equipped with 512K. It should also be noted that the DesignNote 5200's closest competitor, the Gateway Solo 2300SE, significantly outperformed it in the CPU, graphics, CD-ROM and battery tests.

As is common with many dual scan displays, Leo's 12.1in screen was murky and difficult to adjust using the 'soft' controls accessed via the keyboard.

We found the Leo's case flimsy, and its keyboard flexed under normal typing loads. The NiMH battery also underperformed significantly, lasting just over 75 minutes.

On a more positive note, the touchpad, which is almost *de rigueur* at this end of the market, was, unlike the Tech Star Voyager, reasonably touch-sensitive across its entire surface. It also responded well to double tapping although, as is common with these devices, dragging and dropping can be a frustrating experience.

Josh Gliddon

- **Distributor** First International Computers
- **Phone** (02) 9870 8077
- **Price** \$2,999
- **Online** <http://www.fic.com.tw>
- **In short** A below-average performer, but cheap at under \$3,000.

Mitac 5033

MITAC

The Mitac 5033 is almost great. It is sturdy, has a reasonable weight, a perfectly acceptable screen, keyboard and touchpad, and the specifications are very good.

The 4G IBM hard disk drive is almost double the size of others in this group and, in combination with a 233MHz Pentium MMX processor and 32M of RAM, shot to the top of our Business Winstone 98 test in this group with 14.7. It would have done even better with more secondary cache. The drive also helped the Mitac top the Business and High-End Disk WinMark 98 categories.

This notebook's weak point is its NiMH battery life, which was just under two hours — not the lowest in our roundup, but disappointing compared to the winning four hours and 11 minutes. Don't plan on serious road trips without upgrading to a lithium ion model. The other downside is Mitac's price point — its processor, disk and screen advantages



push it about \$800 higher than the Acer Extensa 390C.

Video for the 12.1in active matrix TFT screen is handled by a Trident 9385G video-controller chip with 2M VRAM supporting a maximum external resolution of 1,024 by 768. Basic stereo speakers are built into the case below the screen, and the ESS 1869 sound chip's output is not bad. USB and PC Card expansion is supported along with the usual complement of ports and a basic set of sound jacks.

The Mitac logo had not yet been added to the review notebook's exterior, so we suspect it's a rebadged model. Nothing wrong with that, as long as you can rely on the warranty (which, with its international coverage by agreement with the distributor, is attractive).

Simon Vandore

- **Distributor** Synnex
- **Phone** (03) 9540 0555
- **Price** \$3,999
- **Online** <http://www.synnex.com.au>
- **In short** Good components in a solid, generic notebook, let down only by its battery life.

Discovery 713L

NEC

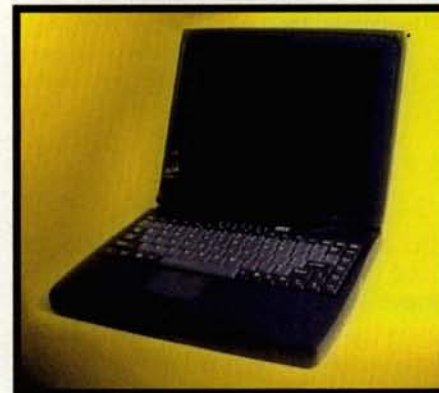
Considering the NEC Discovery 713L had the slowest processor of all the notebooks in this category (Pentium 133MHz MMX), it did not fare too badly, keeping close company with the Leo DesignNote 5200 Cedar and the Gateway Solo 2300SE in most of the tests.

The Discovery 713L was one of only two notebooks using a 512K secondary cache, but this did not save it from scoring below average in all tests with the exception of the CD-ROM WinMark 98 tests, where it gained top position. It occupied third-last position in the Business Winstone 98, Business Disk Win-

Mark 98, High-End Disk WinMark 98 and CPUMark32 tests. The Discovery 713L has a 2.1G hard disk drive and 2M EDO RAM powering its NeoMagic MagicGraph 128XD video-controller chip.

This rather slim notebook featured a 12.1in dual scan screen which was not very good, as far as dual scan screens go. It featured a swappable CD-ROM/floppy bay at the front right of the machine, and its touchpad was easy to control. There was plenty of wrist-rest space below and around the touchpad, and integrated speakers sat above the keyboard. We had concerns about this keyboard — if you are a fast typist, you may find it gently bouncing up and down as you type.

On the battery front, there were no



surprises. The lithium ion battery returned a result of just over two and a half hours, which was not poor, but neither was it impressive.

This notebook is definitely priced on the steep side at \$3,990. NEC will need to smarten up its act if it is to better compete with notebooks at this low end of the market.

Roulla Yiacoumi

- **Distributor** NEC
- **Phone** 1800 812 796
- **Price** \$3,990
- **Online** <http://www.nec.com.au>
- **In short** Overpriced for its performance and features.

Voyager 5000

TECH STAR

Like the Mitac 5033, the Tech Star Voyager 5000 has a class-leading 233MHz MMX processor and 32M of RAM lurking under its keyboard. Unlike the Mitac 5033, however, the Voyager never man-

aged to achieve any higher than sixth place in our tests. Indeed, in the CPU-Mark32 test, it performed worse than any of its competitors bar the Leo DesignNote 5200 Cedar, which used a Pentium 166MHz MMX CPU.

While the manufacturer boasts a battery life of three hours and 40 minutes, the best the Voyager's lithium ion battery could do under our testing conditions (see 'How we tested', page 139) was one hour and 17 minutes, equalling the time of the Leo DesignNote, but still a good 30 minutes behind the remaining notebooks.

Display duties are handled by a commendably clear and crisp 12.1in active matrix display; this was one of only three notebooks in this category to have an active matrix TFT screen. Indeed, the Voyager was the cheapest of the systems with this type of display. The Voyager's 2M of video RAM and 256K secondary cache are also par for this course.

A curious aspect of the Voyager's specification is the Smart Bay, a device bay that ostensibly allows users to add either a CD-ROM drive, a secondary hard disk, a floppy drive or a back-up battery. Unfortunately, it's not possible to hot swap between Smart Bay modules, meaning that if there's a floppy drive in the slot and you want to access a CD-ROM, the machine has to be shut down and rebooted.

Like the Leo DesignNote, the quality of plastics used in construction is not great, although we did not encounter any specific quality-control problems along the



lines of the Leo's wiggly screen.

Josh Gliddon

- **Distributor** Tech Star
- **Phone** (07) 3367 1444
- **Price** \$3,800
- **Online** <http://www.techstar.com.au>
- **In short** Unexceptional performance, but the cheapest notebook with an active matrix display.

low-cost notebook. Its features were up there with the other systems in this category; it was not too heavy (3.3kg travel weight) and its performance, while not spectacular, was adequate.

With a Pentium 200MHz MMX processor, 256K secondary cache and 32M of EDO memory, the Satellite managed a Business Winstone score of 12.6 — slightly above average for the systems we looked at in this category. The disk subsystem, based on a 2.1G Toshiba hard disk, performed well, while the Chips and Technologies processor and 2M of EDO RAM performed to standard in the Business Graphics WinMark 98 benchmark, but fared poorly in High-End Graphics WinMark 98.

The performance of the 20x CD-ROM supplied with the system was fairly average, although it has the advantage of residing simultaneously with the floppy drive inside the chunky grey case of the notebook.

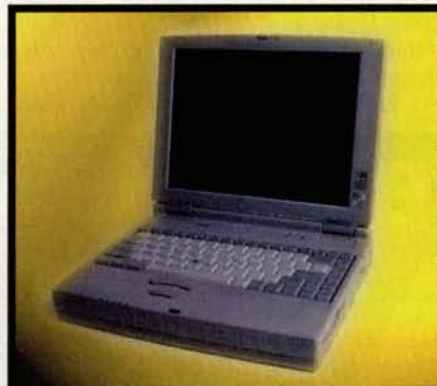
Compared with some generally poor

Satellite 310 CDS

TOSHIBA

The first thing we noticed about this notebook was the poor quality of the 12.1in dual scan screen. After losing our mouse pointer four or five times — it disappeared whenever we moved it — it became apparent that the screen incorporated with this particular notebook was of a sub-standard quality.

Apart from that major failing, the rest of the system seemed acceptable for a



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- APC Magazine March 98



results from other systems in the under-\$4,000 category, the machine's battery performance was relatively good, lasting two hours and 42 minutes.

Priced at \$3,700 and carrying only a one-year warranty, the Toshiba Satellite 310CDS is not the best value machine we looked at, although if fitted with an active matrix TFT screen, it could have proven adequate. Of course, fitting it with a TFT screen would up the price of the system considerably.

Nathan Taylor

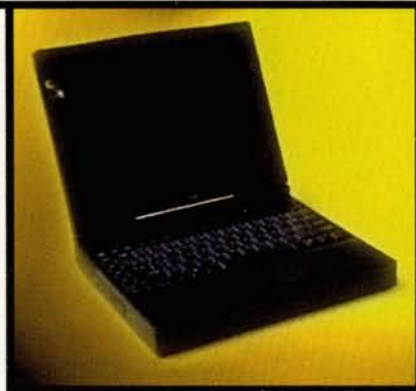
- **Distributor** Toshiba
- **Phone** 1800 021 100
- **Online** <http://www.toshiba.com.au>
- **Price** \$3,700
- **In short** Not a bad machine, but let down by a poor screen.

Slimnote 9

TWINHEAD

The first impression we had of the Slimnote 9 was that it wasn't exactly slim. However, the it does incorporate a number of interesting design features.

Firstly, the 20x CD-ROM is a perma-



nent fixture. This doesn't degrade the notebook's functionality because there's room for a floppy at the same time, although the drive bay's release clip is locked with a screw.

On the positive side, there is a top-mounted cooling fan — no doubt to cool the Pentium 200MHz MMX processor, which managed to perform quite well in the benchmarks, scoring third place in the CPUmark32 test with a value of 384.7, despite having only 256K of secondary cache.

The 2.1G EIDE Hitachi drive performed well and scored a Business Disk WinMark 98 of 768, again coming third,

while the Chips and Technologies video-controller chip with 2M of EDO RAM achieved an acceptable Business Graphics WinMark of 67.7. The overall Business Winstone score of 13.7 placed it third — an admirable result given its \$3,800 price tag. A battery result of just over three hours ranked it third-best in the group.

A rear-mounted LCD panel displays status information, even when the top is down, while speakers mounted on either side of the screen provide clear, if somewhat tinny, sound.

With 32M of RAM, a standard 12.1in active matrix TFT screen and all the usual ports (including a TV-out port), the Slimnote 9 gives a good performance for the price. Twinhead is one of the most popular notebook manufacturers in Taiwan and has been trying to crack the Australian market for some time. The Slimnote 9 might just be its ticket.

Ashton Mills

- **Distributor** Westan
- **Phone** (03) 9563 6775
- **Online** <http://www.twinhead.com.tw>
- **Price** \$3,800
- **In short** A good performer for a good price.

Business machines



Extensa 390CX

ACER

The Acer Extensa 390CX was one of four notebooks in this category incorporating a Pentium 233MHz MMX processor, and the only notebook with 48M of RAM. These specifications paid off, with the Extensa 390CX pulling in some great results.

Less than half a point separated the first four notebooks in the Business Winstone 98 test. The Extensa 390CX ranked fourth on 15.3; top scorer, the Twinhead Slimnote Ex, was only fractionally ahead on 15.7.

The Extensa 390CX's 3.2G IBM hard disk drive proved a winner in our disk tests. In the Business Disk WinMark 98, it scored 882.7, running second to the Digital HiNote VP275. But in the High-End Disk WinMark 98, it overtook the HiNote VP275, scoring 2,400.

The Extensa 390CX also did very well in the Business Graphics WinMark 98, coming in third behind the NEC Versa 2780 and the Twinhead Slimnote Ex. It uses a Chips and Technologies video-controller chip with 2M EDO RAM.

Impressive battery power steered the Extensa 390CX towards the top of the

ladder. Its life of just over five hours was still more than an hour behind the Gateway Solo 2300LS's result, but excellent nonetheless.

At 4.7cm thick, this was one of the slimmest notebooks and also one of the lightest, with a carry weight of 3.7kg. Its 12.1in active matrix TFT screen, with an internal resolution of 800 by 600, was very good and there were no problems with the touchpad.

A great little notebook, the Extensa 390CX is the winner of our Editor's Choice award for this category.

Roulla Yiacoumi



EDITOR'S CHOICE

● Acer Extensa 390CX



The Acer Extensa 390CX packed in a Pentium 233MHz processor with 48M of RAM and returned some very good results. With a sharp 12.1in active matrix TFT display, a battery that lasted a solid five hours and a price tag of under \$4,000, this notebook earns our Editor's Choice award.

- **Distributor** Acer
- **Phone** (02) 9870 1999
- **Price** \$3,999
- **Online** <http://www.acer.com.au>
- **In short** Very good all-round performance and a bargain at under \$4,000.

Latitude CP M166ST

DELL

The Dell Latitude CP M166ST is a Pentium 166MHz MMX-based notebook sporting a standard 256K secondary cache and 32M of EDO RAM. The Latitude is the only notebook in its category, however, that offers much less disk space than its competitors with a 1.6G EIDE IBM drive.

Performance-wise, the Latitude scored below average, with a Business Disk WinMark 98 of 748.7 and Business Graphics WinMark of 72.5. It uses a NeoMagic MagicGraph video-controller chip with 2M EDO RAM. The overall Business Winstone 98 result of 13.2 is fair considering

the notebook is based on a Pentium 166MHz MMX CPU. Its highest score was the CD-ROM WinMark 98 of 967.7, thanks to its 20x CD-ROM drive.

With a sharp 12.1in active matrix TFT screen and a solid keyboard, the Latitude was a pleasure to use. The design has also been well considered. The speakers are side mounted and a rear-mounted fan keeps the internals cool. It's also one of the



easiest notebooks to configure, with an easy-to-remove hard drive and an interchangeable floppy/CD combination. Two bays located at the front make battery or drive replacements nicely accessible.

However, this ease of use is offset by its short lithium ion battery life of just under two hours. While it may be easy to use on the road, don't expect to be using it for long. The short battery life is the only downer, however, as the Latitude's low price of \$3,959 is very reasonable given the performance.

Ashton Mills

- **Distributor** Dell Computer
- **Phone** 1800 808 312
- **Online** <http://www.dell.com.au>
- **Price** \$3,959
- **In short** An easy-to-use and well-designed notebook — just be sure to pack an extra battery.

HiNote VP725

DIGITAL

The Digital HiNote VP725 is one of only two notebooks in this category sporting a 13.3in active matrix TFT screen. Although it may sound like only a small improvement over a 12in screen, the reality is somewhat more impressive. When it comes to notebooks, a large screen is always welcome.

The HiNote VP725 also packs 32M of SDRAM and 512K of secondary cache, giving its Pentium 200MHz MMX CPU that extra boost to score 430.7 in the CPUMark32 test. A 3.2G EIDE IBM drive

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provides ample space and speed, taking it to first place with a score of 883.3 in the Business Disk WinMark 98; while the NeoMagic MagicGraph 128XD video-controller chip with 2M VRAM provided fast performance with a Business Graphics WinMark 98 value of 81.8. The notebook ranked third overall in the benchmarks with a Business Winstone of 15.5, surpassed only by two 233MHz MMX-based notebooks.

As one of the more expensive notebooks in this category, with a price tag of \$6,650, the Digital VP725 was one of two notebooks to offer a higher internal resolution of 1,024 by 768, and one of two to offer Windows NT as the installed operating system. Digital offers a three-year parts and labour warranty and a carry-back with the notebook.

While the lithium ion battery performed well, providing almost three hours of operation, other notebooks in the category — such as the Acer Extensa 390CX — managed five hours or more.

The HiNote VP725 is aimed at those who place an emphasis on performance and extra features not usually associated with 'business' notebooks.

Ashton Mills

- **Distributor** Digital
- **Phone** 132 393
- **Price** \$6,650
- **Online** <http://www.digital.com.au>
- **In short** A powerful business machine with a large screen.

Solo 2300LS

GATEWAY

We admit we were a little sceptical about Gateway's claim that the lithium ion in its Solo 2300LS could last five hours. Imagine how impressed we were



when the Solo broke all APC records with a battery that lasted a whopping six hours and 17 minutes!

Its performance in other areas was not bad; it ranked fifth out of the nine notebooks in the Business Winstone 98 with a score of 13.5. It also ranked fifth in the Business Graphics WinMark 98 test, but did not fare as well in the Business Disk WinMark 98 where it slipped into sixth spot, or the High-End Disk WinMark 98 where it slumped to second-last place. The notebook we tested had a 2G IBM hard disk drive and 2M EDO RAM powering its NeoMagic MagicGraph 128XD video-controller chip.

The Solo 2300LS was also equipped with a Pentium 200MHz MMX processor, 32M of RAM and a 512K secondary cache. The 12.1in active matrix TFT screen was very good and the keyboard was a pleasure to use.

At \$4,299, this notebook is not overpriced. However, it was competing against a notebook that had a faster processor, more RAM, and a bigger hard drive — all for \$300 less. That notebook was the Acer Extensa 390CX, which proved to be a better performer in our stringent tests.

Roulla Yiacoumi

- **Distributor** Gateway
- **Phone** 1800 500 734
- **Price** \$4,299
- **Online** <http://www.gw2k.com.au>
- **In short** If an outstanding battery is at the top of your list, check out this notebook.

ThinkPad 380D

IBM

What a chunky notebook! At 6cm thick, the IBM ThinkPad 380D was certainly the 'brick' of the bunch, but was by no

means the heaviest, with a carry weight of only 3.5kg.

Once again, the IBM notebook had the slowest processor of the group — a Pentium 150MHz MMX. This was complemented by 32M of RAM and a 256K secondary cache, but it failed to make a memorable impression in any of the tests.

The ThinkPad 380D in fact scored below average in every test. It came second last in the Business Winstone 98 test with a result of 11.9, ahead of the Pearl 6400A notebook on 8.7. Its best result was in the Business Disk WinMark 98, where its score of 775 held it in fifth position. In the remaining tests, the ThinkPad 380D sat in either last or second-last place. The notebook uses a 2.1G IBM hard disk drive, with 2M VRAM complementing its NeoMagic MagicGraph 128XD video controller.

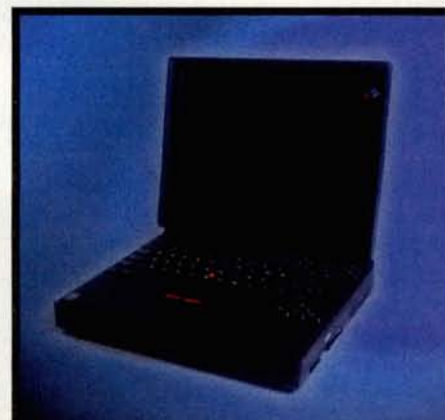
Designed for the businessperson, the ThinkPad 380D incorporates a combined floppy/CD-ROM drive to minimise the 'extras' which need to be hauled with the notebook. However, the 8x CD-ROM drive was easily the slowest, with most of the machines having 20x drives.

This sturdy machine features a crystal-clear 12.1in active matrix TFT display, and we found the keyboard spacious and comfortable. Battery life was also pretty good, lasting just under three hours.

While most of the notebooks offered a two or three-year warranty, notebook leaders IBM and Toshiba could manage only a one-year offering on their business machines.

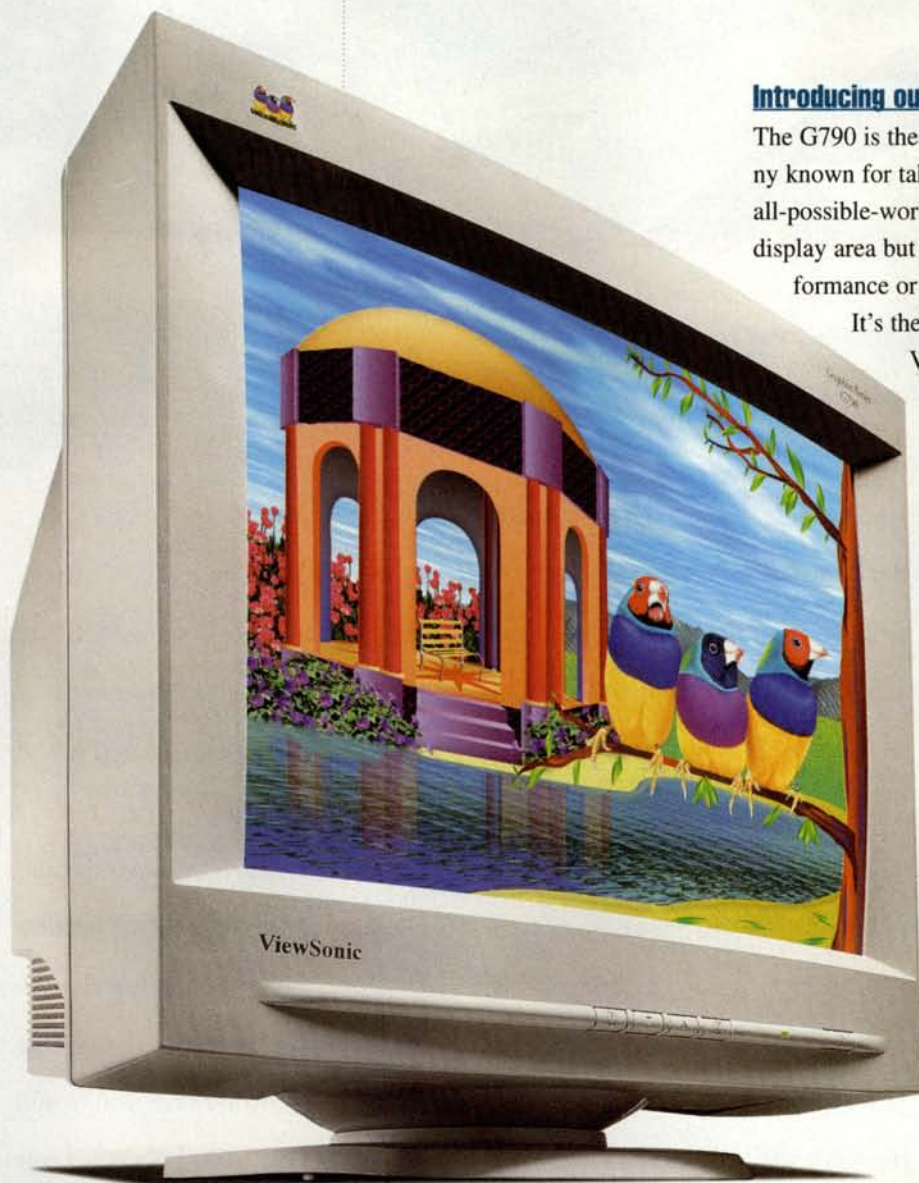
Roulla Yiacoumi

- **Distributor** IBM
- **Phone** 132 426
- **Price** \$5,072
- **Online** <http://www.au.pc.ibm.com>
- **In short** A chunky notebook that failed to make an impression in the performance stakes.



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Versa 2780MT

NEC

With a processor and price that wouldn't have looked out of place in our Power Rush category of notebooks, NEC's business notebook performed well, but was too expensive to be picked for Editor's Choice.

The Versa 2780MT comes with a 233MHz Pentium MMX processor and 32M of EDO DRAM. Graphics are handled by a NeoMagic MagicGraph video-controller chip with 2M of EDO RAM. A clear 12.1in TFT screen, 20x CD-ROM drive, 2.1G hard disk, and 56K modem complete the package.

The 2780MT was not overly heavy (with a travel weight of 3.7kg), and incorporates a sleek design and a responsive touchpad with plenty of wrist space. The floppy and CD-ROM drives can sit in the notebook at the same time, and all the usual expansion ports are provided, including a USB port. The case also features a handy sleep button to provide quick power-up and power-down.

Given its high-end processor, it's not surprising the NEC did well in benchmark tests reliant on processor speed. It also did well in Business Graphics WinMark 98 with a score of 89.1 (the highest in the category), and also topped the CPUMark32 test.

It was let down, however, by relatively poor disk performance and a lithium ion battery that could only last two hours and 41 minutes under BatteryMark 2.0.

The 2780MT comes with a three-year parts and labour warranty, but even this and some promising test results fail to justify the \$7,000-odd purchase price of this notebook.

Nathan Tylor

- **Distributor** NEC
- **Phone** 1800 812 796
- **Price** \$6,945
- **Online** <http://www.nec.com.au>
- **In short** Pretty good performance, but way too expensive.

Pearl 6400A

PEARL

At \$3,620, the Pearl 6400A was the cheapest notebook of this bunch. Unfortunately, the low cost provides you with a product that is low on power and low on performance. It is also a bulky notebook with a hefty travel weight of 4.3 kg.

In the BatteryMark 2.0 test, the Pearl 6400A could last only one hour and 31 minutes. This weak result can be attributed to the use of old NiMH battery technology. The Pearl 6400A was the only notebook in this category to still use this battery type.

The Pearl 6400A did not shine at all in the benchmark tests. It took out last place in all of the tests, with the exception of the CD-ROM WinMark 98, where it was the second-slowest drive.

The 6400A uses an Intel Pentium 200MHz MMX processor, accompanied by 512K of secondary cache and 32M (expandable to 64) of EDO RAM. It uses a 2.1G Hitachi UltraDMA IDE hard disk drive.

The 12.1in active matrix TFT screen was adequate, however there was a noticeable blurring in the bottom half of the screen. The graphics chipset used in this notebook is a Trident Cyber 9385 using 2M of EDO DRAM video memory. The multimedia components of the machine include a 20x CD-ROM drive and a ESS1788 sound subsystem. A headphone, line-in and microphone jacks are located at the right rear of the notebook.



Pearl provides a two-year return-to-base warranty with this machine.
Lachlan Botticchio

- **Distributor** Pearl Computer
- **Phone** (02) 9440 8855
- **Price** \$3,620
- **Online** N/A
- **In short** An inexpensive notebook that performed poorly in all aspects of operation.

Satellite Pro 480CDT

TOSHIBA

Considering the Toshiba Satellite Pro 480CDT was the third-most expensive notebook of the group at \$6,482, its performance was a little underwhelming.

With a Pentium 233MHz MMX processor, 256K secondary cache and 32M of RAM, the Satellite Pro ranked sixth in the Business Winstone 98, and sixth in the CPUMark32 test on 371.3. However, it did a little better in the disk tests, taking out fourth position in both the Business Disk WinMark 98 (841.3) and High-End Disk WinMark 98 (2,160). The notebook used a large 4G Toshiba hard disk drive.

In the Business Graphics WinMark 98, the Satellite Pro came in at 74.9, which was just above the average. It uses a Chips and Technologies video-controller chip with 2M of EDO RAM, and features a 12.1in active matrix TFT screen.

Its lithium ion battery life of two hours and 32 minutes was below the group's average of three hours and 17 minutes, however machines such as the Gateway Solo 2300LS and Acer Extensa 390CX may have skewed the average with their incredible results.

While most notebooks in this category had a two or three-year warranty, Toshiba, like IBM, offers only a one-



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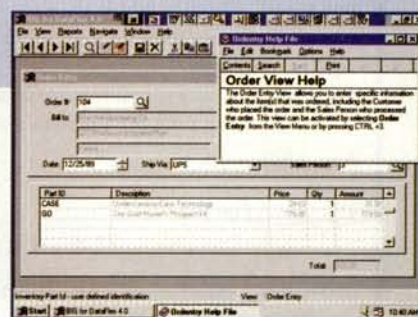
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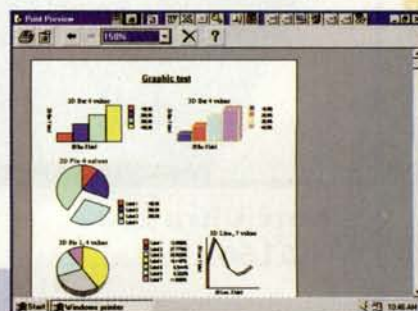
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year warranty with its business notebook. Given these notebooks probably cop a bit of wear and tear, a longer warranty would make the Satellite Pro more attractive.

Claire Waddell

- **Distributor** Toshiba
- **Phone** 1800 021 100
- **Online** <http://www.toshiba.com.au>
- **Price** \$6,482
- **In short** A hefty price tag for only an average performer with a one-year warranty.

Slimnote EX

TWINHEAD

Taiwanese manufacturer Twinhead has been producing notebooks since 1990. We tested the Twinhead Slimnote EX and found it performed consistently well, landing in the top three positions in every test.

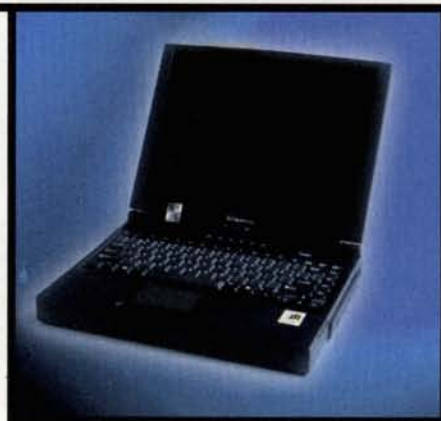
The Slimnote EX had among the highest specifications of the group, using a Pentium 233MHz MMX proces-

sor with 32M of RAM and a 512 secondary cache. It also recorded the highest Business Winstone 98 result of 15.7, just ahead of the NEC Versa 2780 on 15.6 and the Digital HiNote VP725 on 15.5. Its CPU returned a high 457.3 result in the CPUMark32 test.

The 4G hard disk drive helped the Slimnote EX achieve good results in the Business and High-End Disk WinMark 98. It ranked third in both tests, behind the Acer Extensa 390CX and Digital HiNote VP725 in both cases.

The Twinhead EX's score of 84.4 in the Business Graphics WinMark 98 test was particularly good, coming just behind top-scorer, the NEC Versa 2780 on 89.1. It was also one of two machines capable of running the High-End Graphics WinMark 98, with a 13.3in active matrix TFT screen with an internal resolution of 1,024 by 768. It scored 110 in this test.

In the BatteryMark 2.0 test, the Twinhead EX's lithium ion battery life was good (three hours and 52 minutes), the third-longest battery life of the



group. In all, Twinhead has packed in a stack of features and produced a machine to be reckoned with.

Claire Waddell

- **Distributor** Westan
- **Phone** (03) 9563 6775
- **Online** <http://www.twinhead.com.tw>
- **Price** \$5,500
- **In short** Impressive specifications and performance at a hard-to-beat price.

Slimline



HiNote Ultra 2000 GTX5166

DIGITAL

With manufacturers trying to squeeze maximum features into their slim notebooks, it seems battery life is one of the first areas to suffer when smaller, less powerful batteries are used. Indeed, the Slimline category produced the worst battery life average of all the four categories: just two hours and 32 minutes. But the Digital HiNote Ultra 2000 GTX5166 easily bettered this, scoring the top result of three hours and 25 minutes.

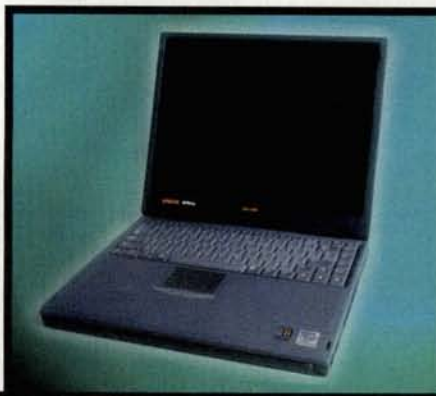
Using a Pentium 166MHz MMX with 32M of RAM and 512K secondary cache,

the HiNote Ultra 2000 was an all-round good performer — with the exception of the two graphics tests in which it ranked second last. The Ultra HiNote 2000 uses a Chips and Technology video-controller chip with 2M VRAM.

In the Business Winstone 98 test, it ranked third on 12.2, behind the Gateway Solo 5100 and Leo DesignNote. It did even better in the Business Disk WinMark 98 and High-End Disk WinMark 98, scoring second place in both, with results of 771.3 and 1,999.3 respectively. In both cases, the Gateway Solo 5100 came out ahead.

The 14.1in active matrix TFT screen was very good. It was one of two notebooks submitted in this category with a

large 14.1in screen (the Gateway Solo 5100 was the second). Bear in mind that although large screens are great to work with, they will add weight to the



machine. The Digital had a bare minimum weight of 3kg, making it the heaviest notebook in this category.

On the design front, this notebook had a very large wrist-rest space, with the keyboard pushed right to the top of the machine. The touchpad was acceptable, perhaps a touch too sensitive, but the click buttons weren't good, and took some force to 'click'. Unlike the IBM ThinkPad 560E, the Ultra HiNote 2000 can take either a floppy or CD-ROM drive in its internal swappable bay. This was also the only notebook to include a 56K modem in its price. An international three-year parts and labour warranty completes the offering.

At the time of writing, Digital informed us this notebook model is to be superseded and therefore will be no longer available. The new models are the GTX5233 (which has a Pentium 233MHz MMX processor for \$7,100) and GTX5266 (which has a Pentium 266MHz MMX processor for \$7,900). Both notebooks will ship with Windows 95 (add \$200 if you'd like Windows NT instead) and will feature an integrated 56K modem, 10/100 Ethernet, 4M of video RAM, 14.1in display, 4G hard disk drive and an amazing 1M of secondary cache.

Roulla Yiacoumi

- **Distributor** Digital
- **Phone** 132 393
- **Price** \$8,740
- **Online** <http://www.digital.com.au>
- **In short** The most expensive of the bunch, but a huge screen and good performance.

Solo 5100

GATEWAY

An excellent performer, the Gateway Solo 5100 took out the top positions in all the tests. It was also one of the cheapest machines of the group and therefore wins our Editor's Choice for this category.

The Solo 5100's Business Winstone 98 score of 14.1 placed it first among the group. The machine uses a Pentium 200MHz MMX CPU with a 512K secondary cache and 32M of SDRAM.

The Solo 5100 has a respectable bare minimum weight of 2.9kg. Only two notebooks were thinner, but it does have a carry weight of 3.6kg, tying it with the weight of the Digital HiNote Ultra 2000.

EDITOR'S CHOICE

● Gateway Solo 5100



With a bare minimum weight of 2.9kg and features which include a 14.1in active matrix TFT screen and a three-year warranty, the Gateway Solo 5100 with Pentium 200MHz processor and 32M of RAM easily topped our disk and graphics tests. Its asking price of \$5,199 was also deemed very attractive.

The IBM ThinkPad 560E, although the slimmest and lightest machine in this category, could not be considered for Editor's Choice because it was submitted to us with the incorrect RAM.

The Solo 5100 is well designed with a strong keyboard that doesn't flex at the touch, making it a pleasure to use. The huge 14.1in active matrix TFT screen is clear, and the stock standard swappable floppy/CD drive bay is nicely placed in the middle front of the machine.

The 2G IBM hard disk drive produced a Business Disk WinMark 98 of 800 and a High-End Disk WinMark 98 of 2100 — both the top results. A Chips and Technology video-controller chip with 2M of EDO RAM also proved successful, with number one results in both the Business Graphics WinMark 98 (78.1) and High-End Graphics WinMark 98 (109).

Given the price tag of \$5,199, you could forgive the Solo 5100 for not being a tad slimmer. But a lithium ion battery life of just over two hours (despite Gateway's claim of four) was a little disappointing.

That aside, it was one of the cheaper slimline notebooks we reviewed and, with Gateway's three-year warranty, is a great choice for those who want

mobility without compromising performance.

Ashton Mills

- **Distributor** Gateway
- **Phone** (02) 9641 2660
- **Online** <http://www.gw2k.com.au>
- **Price** \$5,199
- **In short** A top performer at a good price, but not the best battery life.

ThinkPad 560E

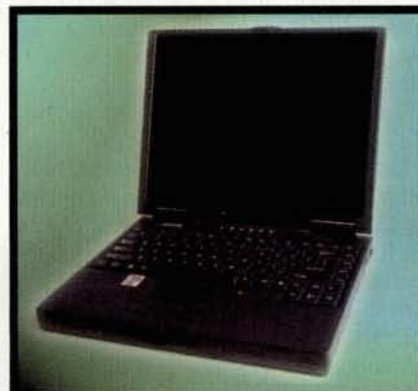
IBM

The IBM ThinkPad 560E may be the cheapest notebook in this category, it may also be the slimmest, but it was also the weakest performer. This can be explained by the fact that IBM submitted this machine for review with just 16M of RAM instead of the 32M we specified. It was also the only notebook with a 256K secondary cache rather than a 512K one.

Its Pentium 166MHz MMX processor was the same as the Digital HiNote Ultra 2000 and the NEC Versa 5060MX, while the other two notebooks opted for faster processors. The ThinkPad 560E returned a CPUMark32 of 331.7, placing it in fifth position, just ahead of the NEC Versa 5060MX on 326.7.

The ThinkPad 560 occupied last position in the Business Winstone 98 test with a result of 9.9, coming in behind the NEC Versa 5060MX on 11.8. It was also last in the Business Graphics WinMark 98 test on 49.1, more than 10 points behind the Digital HiNote Ultra 2000. Because the ThinkPad 560 had an internal resolution of only 800 by 600, it was unable to complete the High-End Graphics WinMark 98 test which requires a resolution of 1,024 by 768 to run.

The 2.1G IBM drive didn't perform too well in the Business Disk WinMark



98 or High-End Disk WinMark 98 tests either, achieving results of 740.3 and 1843.3 respectively — placing the notebook at the lower end of the results scale. It was unable to complete the CD-ROM WinMark 98 test as it did not come equipped with a CD-ROM drive. One is available, however, for \$768.

The ThinkPad 560 had a great active matrix TFT screen, although it was the smallest at only 12.1in. If you need to travel with a notebook, it is the lightest of the bunch, with a bare minimum weight of just 1.9kg. The notebook is so thin, however, that both the floppy and CD-ROM drive (should you choose to buy it) need to be attached externally and so must be carried as extras.

With an extra 16M of RAM the IBM ThinkPad 560E would have been up there with the best in this class and would certainly have been a contender for Editor's Choice.

Roulla Yiacoumi

- **Distributor** IBM
- **Phone** 132 426
- **Price** \$4,171
- **Online** <http://www.au.pc.ibm.com>
- **In short** The slimmest notebook at just 3.2cm thick, but needs an extra 16M to boost performance.

DesignNote 6000

LEO

The DesignNote 6000 from First International Computer was the thickest notebook of the group, but not the heaviest, with a bare minimum weight of 2.6kg. The DesignNote had the most powerful processor in this category, using an Intel Pentium 233MHz MMX processor with 32M of RAM and a 512K secondary cache. This saw the DesignNote ranked first in the CPUmark32 processor test on

440.7, a comfortable margin ahead of the Gateway Solo 5100 on 424.3. Its other results, however, did not really reflect its powerful configuration.

Using a 1.6G hard disk drive (by far the smallest of the group), it sat in last position in the Business Disk WinMark 98 tests. It did a little better in the High-End Graphics WinMark 98 tests, pulling in the third-best result of 1,946.7. Its battery lasted two hours and 51 minutes — second only to the Digital HiNote Ultra 2000, which lasted about half an hour longer.

A NeoMagic MagicGraph 128XD video-controller chip with 2M of EDO DRAM worked together with the 13.3in display to bring the DesignNote into second position in both the Business and High-End Graphics WinMark 98 tests (coming in behind the Gateway Solo 5100 in both cases). Audio is supplied by a Yamaha OPL3-SA 3D audio processor. The Leo's 20x CD-ROM drive was also the fastest in the category, achieving a maximum transfer of 1,070 thousand bytes per second.

It wasn't the slimmest of the notebooks we looked at, but the DesignNote 6000 was a good performer in most tests and is not bad value for its \$5,899 asking price.

Lachlan Botticchio

- **Distributor** First International Computer
- **Phone** (02) 9870 8077
- **Price** \$5,899
- **Online** <http://www.fic.com.tw>
- **In short** A fast notebook with a good battery.

Versa 5060MX

NEC

At \$7,695, the Versa 5060MX from NEC is neither the most extravagantly featured nor the fastest computer in this category, yet its price is exceeded only by that of the Digital HiNote Ultra 2000.

Like the IBM ThinkPad 560E and Digital HiNote Ultra 2000, the Versa 5060MX sports a Pentium 166MHz MMX processor. It also comes with 32M of EDO memory, a 256K secondary cache, a 3G hard disk drive and an additional 2M for the NeoMagic MagicGraph 128XD graphics accelerator. A 20x CD-ROM is also provided in the package, as is the standard floppy disk



(unfortunately, they cannot both be in the Versa simultaneously). Sound is provided by a generic Sound Blaster-compatible sound chip and a pair of rather tinny-sounding speakers. A 56K modem is optional, and there is no docking bay available yet.

The performance of the Versa 5060MX left something to be desired. With the exception of the Business Disk and Business Graphics WinMark 98 benchmarks, the Versa 5060MX came last or second last in all our tests. In the Business Graphics and Disk tests, it managed to claw its way into the middle of the field, coming third out of five in both benchmarks. Its battery performance was easily the worst in the group; it only managed to chug away for an hour and 37 minutes before packing it in.

The best things the Versa 5060MX has going for it are a very nice 13.3in active matrix TFT screen, a handy software bundle (including McAfee VirusScan, Laplink, First Aid 95 and a customised help centre) and a very responsive touchpad. In addition, while the case is not as slim as some of the other designs, the notebook is quite light — only the IBM is lighter.

Despite these few good points, it is difficult to justify the cost of the system, particularly when compared to the other notebooks in our review — several of which are as light or lighter than the Versa 5060MX, perform better, and yet cost so much less.

Nathan Taylor

- **Distributor** NEC
- **Phone** 1800 812 796
- **Price** \$7,695
- **Online** <http://www.nec.com.au>
- **In short** Some good features, but a ho-hum performer and expensive to boot.



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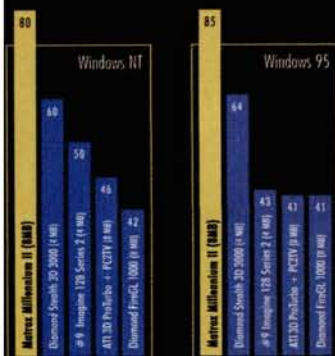
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* All performance tests conducted by Matrox Graphics Inc. Windows NT 4.0 tests conducted on a Dell Pentium Pro 200 Mhz with 32 MB of EDODRAM and 256K cache. Matrox Millennium II, Diamond Stealth 3D 3000, Number Nine Imagine 128 series 2, ATI 3D ProTurbo+PC2TV and Diamond FireGL 1000 tested using driver releases 3.06, 2.03, 4.102.21, 3.1.75 and 2.70.4.0.27 respectively. Windows 95 testing was done on a Gateway 200 Mhz MMX with 32 MB of RAM and 512K cache using driver release 3.41, 4.03.00.3105, 3.12, 3.03 and 4.03.00.3101.0009 respectively. All boards tested were configured with maximum memory configurations. Winbench 97 business tests conducted at 1024 x 768 @74-bit at 75 Hz using small fonts under Windows NT 4.0 and 95.

Power rush

TravelMate 7100TE

ACER

Even though this notebook was packed with 128M of RAM — more than any other notebook in this category — it consistently ranked on the bottom rungs of both the disk and graphics tests.

In fact, the machine submitted by Acer in the business machine category, the Acer Extensa 390CX, scored better than or close to the results achieved by the top-of-the-line TravelMate 7100TE. And it is less than half the price.

The TravelMate 7100TE features an Intel Pentium 266MHz MMX processor within its curvy case, as well as a 4G hard disk drive and 13.1in active matrix TFT display.

In the Business Winstone 98 test, the TravelMate sat at the bottom of the ladder on 15.9, although this was a tightly-packed field. In both the Business Disk WinMark 98 and High-End Disk Win-



Mark 98 tests, the TravelMate suffered the same fate, occupying last positions with results of 858.7 and 2,386.7 respectively. Graphics performance also failed to impress, with both the Business Graphics WinMark 98 and High-End Graphics WinMark 98 ranking second last, fractionally ahead of the IBM ThinkPad 770 in both cases.

EDITOR'S CHOICE

● Gateway Solo 9100X

HIGHLY COMMENDED

● Dell Inspiron 3200



Both the Gateway Solo 9100XL and Dell Inspiron 3200 use Intel's latest Pentium II 266MHz mobile processor.

The Gateway Solo 9100XL, with 64M of RAM, just about cleaned up in this category, claiming the top spot in several tests. Features such as a 14.1in active matrix display, DVD-ROM drive and 8G hard drive are hard to pass up, however this notebook will set you back \$8,499 — almost \$3,000 more than the Inspiron 3200.

The Dell Inspiron, with 32M of RAM, scored very highly in all the tests and knocked us out with its \$5,539 price tag. Because it was submitted to APC with 32M of RAM instead of the 64M we specified, we were unable to award this machine our Editor's Choice award. However, it is still an excellent machine and for this reason we award it our Highly Commended accolade.

The TravelMate uses a NeoMagic MagicGraph 128XD video-controller chip with 2M of EDO RAM. The CPUmark32 was the test where the TravelMate's result of 341.7 stood out the most: not only was the result way below the group's average of 532.2, but the IBM ThinkPad 770, which scored the next-lowest result, was more than 100 points ahead on 467.

There were a couple of other niggling characteristics. The touchpad was a little fickle — we found we had better control on the lower-end Acer models, the Extensa 390C and 390CX. Furthermore,

in a somewhat unusual move, Acer has opted not to incorporate an on/off switch into this model, instead designing the notebook to automatically switch on when the lid is lifted.

One area in which the notebook did excel was the battery test, pulling in an impressive four hours and 50 minutes — more than an hour ahead of its nearest competitor, the IBM ThinkPad 770.

Battery life aside, the Acer TravelMate 7100TE's price tag of just under \$9,000 dollars is difficult to justify.

Roulla Yiacoumi

- **Distributor** Acer Computer
- **Phone** (02) 9870 1999
- **Price** \$8,799
- **Online** <http://www.acer.com.au>
- **In short** Fantastic battery life, but poor benchmark performance.

Inspiron 3200

DELL

The cheapest notebook in this category at just \$5,539 — almost half the price of the IBM ThinkPad 770 — the Dell Inspiron 3200 proved excellent value for money.

This machine was one of only two notebooks in this category (the other was the Gateway Solo 9100XL) sporting



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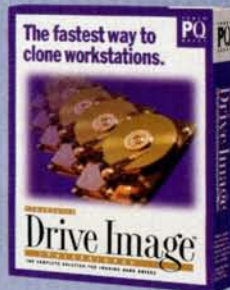


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POWER®
PQ
QUEST

Intel's new Pentium II 266MHz mobile processor. It has 32M of RAM and 2M of EDO video RAM compared to the Solo's more powerful 64M of RAM (even though we requested 64M) and 4M SGRAM video RAM. Taking these differences into account, the Inspiron 3200 performed admirably. It came second to the Solo machine in four of the tests — by a considerably narrow margin.

In the Business Winstone 98 test, the Inspiron 3200 sat on 18.5, just behind the Solo on 20.2. The Business Graphics WinMark 98 scores were just as close, with the Inspiron on 101, closely behind the Solo's 109.

Remarkably, the Inspiron 3200 pulled in a higher High-End Graphics WinMark 98 result: 135 compared to the Gateway Solo 9100XL's 132. Both notebooks used the same Trident Cyber 9397 video-controller chip (all the other notebooks in this category used NeoMagic's MagicGraph 128XD).

The story was a little different when it came to the disk tests, where the Solo consistently outperformed the Inspiron. In the Business Disk WinMark 98, the Inspiron ranked fourth on 924, but took second position in the High-End Disk WinMark 98 with 2,610. The Inspiron features a 3.2G IBM hard drive.

Disappointingly, the Inspiron faltered in our battery test, scoring one of the lowest results. Its lithium ion battery pulled in a result of two hours and 32 minutes. After a few hours of continual use the notebook was not warm, however the gentle hum of the cooling fan was noticeable.

The Inspiron was the slimmest of the notebooks in the category, and had the lightest bare minimum weight of 3.1kg. Incorporating a 13.1in active matrix TFT display and a sturdy keyboard, this is a solid machine for the value-seeking power user.

Roulla Yiacoumi

- **Distributor** Dell Computer
- **Phone** 1800 808 312
- **Price** \$5,539
- **Online** <http://www.dell.com.au>
- **In short** Excellent value for money with great performance to boot.

HiNote VP745

DIGITAL

A machine with an interesting design, the HiNote VP745 was no great speed



demon, but produced adequate results at a price comparable to other vendors' top-of-the-line notebooks.

Not exceedingly heavy and endowed with a great 13.3in TFT screen, the HiNote VP745 was certainly one of the more attractive designs we looked at, with such attention to detail as function and character keys in slightly different shades of grey. The only real problems were a keyboard that seemed to slope away slightly (a little awkward when you're not used to it) and a touchpad that was a tad over-sensitive.

The VP745 utilises a 266MHz Pentium MMX processor in addition to a 512K cache. It comes with 32M of SDRAM (although we specified 64M for testing), and an additional 2M of VRAM is used to help the NeoMagic MagicGraph 128XD chip in its task. It uses a 4.1G hard disk drive.

The performance of the VP745 was nothing spectacular; results were in the mid to low range compared with the other notebooks we received. This was not surprising, running as it was against two Pentium II systems, and a system with significantly more RAM. It scored 16.9 in Business Winstone 98, slightly lower than the average of 17.5. Its graphics and disk scores were similarly mid-range, although the CD-ROM drive performed particularly poorly, coming last with a CD-ROM WinMark of 951. Even the battery performance was average; the lithium ion battery managed to last only two hours and 52 minutes.

Nathan Taylor

- **Distributor** Digital
- **Phone** 13 23 93
- **Price** \$8,200
- **Online** <http://www.digital.com.au>
- **In short** A great design, but fairly average performance.

Solo 9100XL

GATEWAY

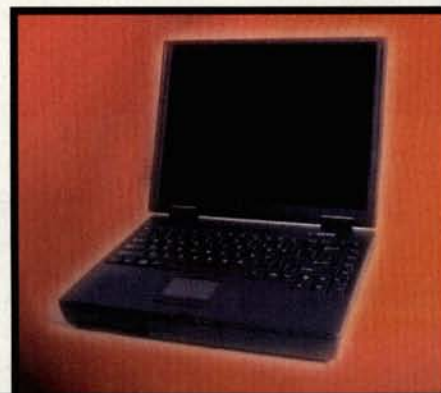
This is power — the Solo 9100XL is the best-performing notebook APC has yet reviewed. But it was also one of the heaviest at 4.4kg, and seems pricey at first glance.

But a look at the specifications tells a different story. The Solo 9100XL packs raw 266MHz Pentium II power, backed up by 64M of SDRAM and a 512K cache; a 5G hard drive (which will be shipping with an 8G for the same price by the time you read this); and a 4M SGRAM Trident Cyber video system with a huge 14.1in active matrix TFT screen. Add a DVD-ROM drive (combined in a removable unit with the floppy drive), 56K modem, Yamaha 16-bit soundcard and a great battery, and the result is impressive. This notebook even ships with a genuine leather carry case.

Naturally, a machine of this calibre sat firmly at the top of our Business Winstone 98 (20.2), Business Disk WinMark 98 (1,050) and High-End Disk WinMark 98 (3,053.3), Business Graphics WinMark 98 (109) and CPUMark32 (689) tests, being shunted out only by the Dell Inspiron 3200 in the High-End Graphics WinMark 98, and let down slightly by the DVD-ROM's reading of standard CDs.

Working with such a machine was a pleasure, although it was always warm to the touch and a little over-sensitive in distinguishing a mouse finger tap from a slide. On the other hand, we've never seen so many expansion ports on a single notebook — a full set of multimedia jacks, USB, PC Card, infra-red and the rest, without even a hint of clutter. DVD movie performance was amazing on the large display, which has a bigger viewable area than a 15in monitor.

With such a level of technology available at this price level, it's difficult to contemplate paying over \$10,000 for certain



Tillamook models. If you need serious grunt now you'll want this notebook.

Simon Vandore

- **Distributor** Gateway
- **Phone** 1800 500 734
- **Price** \$8,499
- **Online** <http://www.gw2k.com.au>
- **In short** The most impressive notebook yet.

ThinkPad 770

IBM

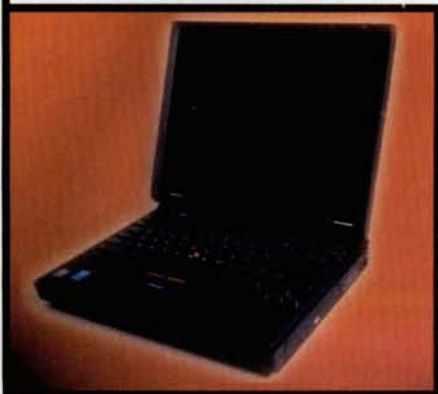
When we looked at the IBM ThinkPad 770 in a roundup of Pentium 233MHz MMX notebooks back in January, it had the best performance of the bunch, as well as some great features, including an awesome 14.1in display and DVD-ROM drive.

This time, however, the ThinkPad 770 has been seriously outclassed. Its Pentium 233MHz MMX processor with 32M of RAM was the slowest of all the notebooks submitted in this category, even though vendors were asked to submit notebooks with a minimum 266MHz MMX processor with 64M of RAM. As a result, its performance in both the graphics and CPU tests suffered.

The ThinkPad 770 came last in both the Business and High-End Graphics WinMark 98 tests, with scores of 86 and 111.3 respectively, slightly behind the Acer TravelMate 7100TE both times. The ThinkPad uses a Trident Cyber 9397 video-controller chip and 2M of EDO RAM.

Its result in the CPUMark32 was also low, but this was expected. With a result of 467, it took out second-last place, ahead of the Acer TravelMate 7100TE. In the overall Business Winstone 98 test, it came in second last again on 16.1, fractionally ahead of the Acer TravelMate 7100TE on 15.9, and just behind the Digital HiNote VP745 on 16.9.

The ThinkPad 770 fared much better



APC LABS

■ How we tested

To test the relative performance of today's most advanced notebook computers, APC Labs used the new Ziff-Davis Winstone 98 and WinBench 98 suites of benchmark software.

Winstone 98 runs a suite of modern business and high-end processor-intensive and graphics applications. The run of these applications is timed to measure how long the system takes to complete each task. The Winstone benchmark is split into two tests, the High-End Winstone 98 and Business Winstone 98.

Previous versions of the Winstone suite allowed us to run both the Business and High-End tests on systems that met the necessary memory requirements. Winstone 98, however, requires Windows NT 4.0 to run the High-End Winstone test, which tests the system using intensive graphics applications. Since Windows 95 is still the preferred operating system for notebook computer users, we tested all the notebooks under Windows 95 for this feature. Therefore we were unable to run the High-End Winstone tests.

The **Business Winstone 98** result is a comparative score of how fast the computer could complete the various business applications.

WinBench 98 contains a set of subtests, each designed to find out how fast each component of a PC really is.

Business and High-End Graphics WinMark 98 measures the system's graphics performance when performing video tasks associated with common business applications, as well as demanding multimedia and 3D applications.

Business and High-End Disk WinMark 98 provides a measure of how a system's hard disk subsystem handles a load equivalent to that demanded by the business applications used in the Business Winstone 98 test.

CPUMark32 lets us compare how fast the processor, memory and cache subsystems are.

CD-ROM WinMark 98 tests the CD-ROM drive, adapter and software drivers. The result is an overall measure of how fast the CD-ROM components transfer data.



BatteryMark 2.0 is a measure of how long a notebook's battery will last when run with no power-saving features enabled.

All the notebooks in this review were tested to their maximum capabilities. Power management was disabled during all testing. Each test was run three times and the final result calculated from the average of these figures.

The BatteryMark 2.0 test was run twice. This run included two conditioning tests (to get the battery in perfect working order) and the two real life tests to measure the battery's life span. The program automatically runs additional life tests if any discrepancies are evident.

All notebooks ran the Business Winstone 98 test. Systems that were only capable of running a maximum (non-virtual) screen resolution of 800 by 600 were not able to run the High-End Graphics WinMark test, which requires a resolution of 1,024 by 768. All the other systems were tested at this resolution with a depth of 256 colours.

To determine how much the notebooks weighed, we looked at both the bare minimum and travel weight of each machine. The bare minimum result was what we determined to be the minimum weight that would have to be carried — including the notebook's CD-ROM drive and battery. The travel weight is how much the notebook would weigh if you were to carry the minimum weight, plus all drives (including external ones), cables, and power pack.

All the notebooks tested were shipping versions available to the general public, unless otherwise stated. Because of the lead time between testing the machines and publication, please note that some specifications and prices may have changed. Be sure to check this information with the vendor before purchase.

These tests were performed without independent verification by Ziff-Davis and Ziff-Davis makes no representation or warranties as to the results. WinBench is a registered trademark of the Ziff-Davis Publishing Company.

Lachlan Botticchio

in the disk tests, sliding into second position behind the Gateway Solo 9100XL in the Business Disk WinMark 98 test and third position in the High-End Disk WinMark 98 test. It uses a 5.1G IBM hard disk drive. Its battery result of three hours and 19 minutes was also very good.

As with our January notebook comparison, at \$10,305, the ThinkPad 770 was the most expensive notebook in this line-up. It does, however, have a super 14.1in screen — easily the best of all 30 notebooks in this feature — an internal modem, an optional DVD-ROM drive, and a unique warranty. It is sturdily constructed with a great keyboard and track-point navigational device.

No doubt by the time you read this, IBM will have a faster processor on the market that is better able to compete with notebooks at the higher end.

Roulla Yiacomou

- **Distributor** IBM
- **Phone** 132 426
- **Price** \$10,305
- **Online** <http://www.au.pc.ibm.com>
- **In short** The slowest processor of the bunch, but a magnificent screen and excellent features.

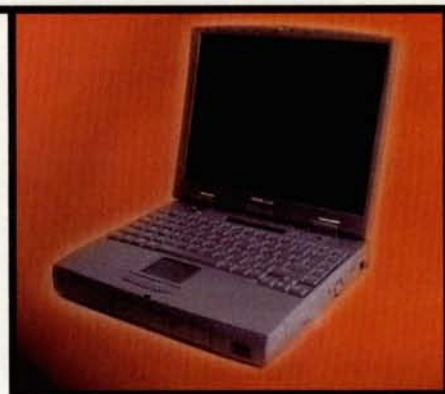
Versa 6260

NEC

A close examination of the benchmark tests shows the Versa 6260 to be the fastest of the Pentium-based notebooks we investigated. The Pentium 266MHz MMX processor is complemented by 64M of EDO DRAM and 512K of secondary cache.

In all the performance benchmarks (except for the High-End Disk WinMark), the Versa 6260 was the fastest of the Pentium 266MHz MMX notebooks. Weighing in at a relatively light 3.6kg, this machine features a 5.1G EIDE hard disk drive and a NeoMagic MagicGraph 128XD accelerator which uses 2M of EDO DRAM to provide extended colour depth. This takes best advantage of the 13.3in active matrix TFT screen.

The unit features a front-mounted floppy drive, which is interchangeable with a CD-ROM or other removable storage drives. A single infra-red panel is located at the front of the notebook's base. The back of the unit provides connections for an external monitor, a serial port, an expansion port and a parallel port for a printer or Zip drive. There is also a single USB connector available.



At the time of reviewing, the Versa was the second-most expensive notebook in the review, much more expensive than the Pentium II-equipped models from Dell and Gateway. It also had the shortest battery life, lasting only two hours and 25 minutes.

Lachlan Botticchio

- **Distributor** NEC
- **Phone** 1800 812 796
- **Price** \$10,159
- **Online** <http://www.nec.com.au>
- **In short** The fastest Pentium 266MHz notebook tested, although quite an expensive machine.

PowerBook G3

APPLE

Expected to compete with Pentium II notebooks, the Apple PowerBook G3 is the first in the PowerBook range with a PowerPC 750 processor.

The PowerBook G3 has a 250MHz processor, and a 512K L2 cache which communicates with the processor at 100MHz. The system is based on a 50MHz-system bus and PCI architecture and ships with 32M of EDO RAM with one expansion slot, expandable to 160M, and a 5G IDE hard disk.

Graphics performance is provided by a Chips and Technologies video-controller chip with 2M of SDRAM. The video system is Zoomed Video-ready, allowing video capture with an optional third-party PC card. The expansion bay allows hot-swapping between the included 1.4M floppy drive, 20x CD-ROM and ingenious PC Card carrying case.

One of the most important features of any notebook is the screen, and the PowerBook G3 lags behind its PC competitors with a 12.1in active matrix screen capable of only 800 by 600 resolution. Pointer control is via the enhanced track-

pad, which supports both single and double taps. External interfaces are ADB, serial, VGA-video, sound and an IrDA-compatible infra-red port. An external SCSI bus allows the connection of six external devices, and the internal Ethernet card provides a 10BaseT connection. Apple claims the lithium ion battery provides an average of between two and four hours of use.

The performance of the PowerBook G3 was exceptional, scoring just shy of the Power Macintosh G3 and blitzing the PowerBook 3400c/200 in most MacBench 4.0 tests. In the processor test, the G3 scored 732, more than twice the 308 scored by the 3400c. The Graphics test showed even more disparity, with the G3 scoring 448, impressively higher than the 3400c's 100, but surprisingly not far off the 563 scored by the Power Mac G3. Disk and CD-ROM tests also show superiority, with 100% and 70% increases over the 3400c.

Ari Weisz-Koves

- **Distributor** Apple Computer
- **Phone** 1300 300 755
- **Price** \$8,611
- **Online** <http://www.apple.com.au>

- **In short** Ideal for presentation use, the PowerBook G3 is one of the fastest Macintosh systems ever built and costs less than many of its PC competitors.

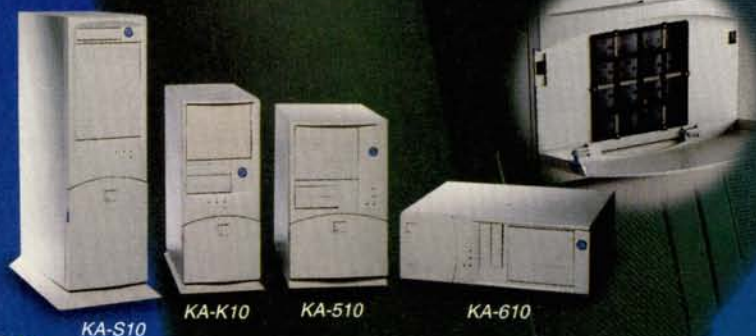
Specifications: The Apple PowerBook G3 tested in APC Labs featured a 250MHz Motorola PowerPC G3 CPU with 32M of EDO RAM and a 512K secondary cache. It had a 5G IDE hard disk drive, 2M of video RAM powering its Chips and Technologies video controller, and a 12.1in active matrix TFT display capable of an 800 by 600 internal resolution. It used a 20x CD-ROM drive, lithium ion battery and had a travel weight of 4.2kg. The machine is covered by an international one-year RTB, parts and labour warranty.

ZIFF-DAVIS' MACBENCH 4.0	
MacBench 4.0 Processor score:	32
MacBench 4.0 Floating Point score:	504
MacBench 4.0 Disk score:	316
MacBench 4.0 Publishing score:	232
MacBench 4.0 Graphics score:	448
MacBench 4.0 Lo-Res Publishing Graphics score:	392

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SunRise ATX/AT Series

- Aero dynamic shape & finish
- Cooling ventilation w/dust filter
- Easy rear outward M/B tray
- Extra one cooling fan installed
- Anti theft Security Lock



19" Industrial Rack Mount Case

- Suitable for ATX/AT form factor
- Extra large cooling fan through dust filter
- Optionally for dual hot swappable P/S



Super NT Files Server Cases

- Easy to join/break up both systems and storage devices cases in one/two
- Optionally fitted in with Dual Hot swappable P/S Internal UPS
- Hot Swappable RAID Mobile Racks
- Convertible to 19" rack mount cases



Storage Cases

- For SCSI/fast wide SCSI 68 pins
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- Aluminum alloy structure for excellent heat dissipation
- Cooling fan through dust filter



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Australia / Sydney Unit 3,100-108 Asquith Street Silverwater NSW 2128 Tel: 02-974809001 Fax: 02-97480095

Results and specifications: Notebooks under \$4,000

Product	Acer Extensa 390C	Gateway Solo 2300SE	KTX 1000	Leo DesignNote 5200 Cedar	Mitac 5033
Distributor	Acer Computer	Gateway	Edge Technology	First International Computer	Synnex
Phone	(02) 9870 1999	1800 500 734	(02) 9353 9200	(02) 9870 8077	(03) 9540 0555
Fax	(02) 9878 6227	(02) 9641 2660	(02) 9353 9222	(02) 9870 8177	(03) 9540 0588
Online	http://www.acer.com.au	http://www.gw2k.com.au	http://www.edge.net.au	http://www.fic.com.tw	http://www.synnex.com.au
Price	\$3,199	\$2,999	\$4,000	\$2,999	\$3,999
SPECIFICATIONS					
Processor	Intel Pentium 200MHz MMX	Intel Pentium 166MHz MMX	Intel Pentium 200MHz MMX	Intel Pentium 166MHz MMX	Intel Pentium 233MHz MMX
Secondary cache (K)	256	256	512	256	256
Tested/maximum RAM (M) and type	48/128 EDO	16/192 SDRAM	32/128 EDO	32/80 EDO	32/96 EDO
Hard disk drive	2.1G EIDE IBM	2G EIDE IBM	2G IDE Hitachi	1.6G EIDE IBM	4G EIDE IBM
Hard disk controller	Mode 4 EIDE	Mode 4 EIDE	Mode 4 EIDE	Mode 4 EIDE	Mode 4 EIDE
Hard disk file system	FAT	FAT	FAT	FAT	FAT32
Video bus type	PCI	PCI	PCI	PCI	PCI
Video RAM	2M EDO	2M EDO	2M EDO	2M VRAM	2M VRAM
Video controller chip	Chips and Technologies 65555 HiQVPro (64-bit)	NeoMagic MagicGraph 128XD	Cirrus Logic 755x	NeoMagic MagicGraph 128ZV	Trident 9385G
Tested resolution/colour depth/refresh rate	800 by 600/256/60MHz	800 by 600/256/60MHz	800 by 600/256/60MHz	800 by 600/256/60MHz	800 by 600/256/60MHz
Pointer device	Touchpad	Touchpad	Touchpad	Touchpad	Touchpad
Dimensions (cm) (H by W by D)	4.7 by 24.2 by 31	4.6 by 23.2 by 28.7	4.4 by 24.3 by 30.8	4.5 by 24 by 29.5	4.6 by 23.8 by 29.5
Bare minimum weight (kg)	3.1	3.1	3.2	3.4	3.3
Travel weight (kg)	3.8	3.5	3.5	3.8	3.7
PC Card slot type	2 Type II or 1 Type III	2 Type II or 1 Type III	2 Type II or 1 Type III	2 Type II or 1 Type III	2 Type II or 1 Type III
Port replicator	\$295	\$299	\$349	\$280	No
Docking station	No	\$999	\$549	No	No
CD-ROM drive	20x	Optional 20x \$199	20x	10x	20x
Tested CD-ROM controller/cache setting	ATAPI/Windows	ATAPI/Windows	ATAPI/Windows	ATAPI/Windows	ATAPI/Windows
Soundcard	Yamaha	Yamaha	Crystal PnP Audio System	ESS 1878	ESS 1869
Modem	Optional 56K \$412	Optional 33.6K \$279	No	Optional 33.6K \$260, 56K \$499	Optional 33.6K \$345
Display	12.1in HighScan	12.1in dual scan	12.1in active matrix TFT	12.1in dual scan	12.1in active matrix TFT
Maximum internal resolution by no. of colours	800 by 600 by 16.7 million	800 by 600 by 65K	1,024 by 768 by 65K	800 by 600 by 256	800 by 600 by 16 million
Maximum external resolution by no. of colours	1,024 by 768 by 64K	1,280 by 1,024 by 256	1,280 by 1,024 by 64K	1,024 by 768 by 64K	1,024 by 768 by 16 million
Manufacturer-claimed battery life (hours:minutes)	4:00	3:00	4:00	1:30	2:00
APC Labs-tested BatteryMark 2.0 (hours:minutes)	4:11	2:41	3:38	1:17	1:57
Battery type	NiMH	NiMH	Lithium ion	NiMH	NiMH
Carry case included in price	No	Yes	Yes	Yes	No
Operating systems available	Windows 95	Windows 95	Windows 95	Windows 95	Windows 95
Warranty terms	3 years RTB parts, 1 year labour, local and international	3 years RTB parts and labour, local	2 years RTB parts and labour, international	1 year parts, 3 years labour, RTB local	3 years RTB parts and labour, international (by agreement with distributor)
BENCHMARK RESULTS					
Business Winstone 98	14	6.5	14	11.3	14.7
Business Disk WinMark 98	749.7	670.3	759.3	678.3	875.7
High-End Disk WinMark 98	2,050	1,566.70	1,986.70	1,640	2,323.30
Business Graphics WinMark 98	77.2	63.1	70.6	50.2	70.9
High-End Graphics WinMark 98	N/A ⁵	N/A ⁵	N/A ⁵	N/A ⁵	N/A ⁵
CPUMark32	375.3	337	421	309.7	413.7
CD-ROM WinMark 98	1,006.70	N/A ⁶	1,043.30	902	1,016.70

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2. Winstone, WinBench and associated programs are registered trademarks of the Ziff-Davis Publishing Company.

3. These tests were performed without independent verification by Ziff-Davis and Ziff-Davis makes no representations as to the results.

4. To test the battery we had APM enabled on all notebooks. All power-saving features were disabled.

5. Notebooks require an internal resolution of 1,024 by 768 to run this test.

6. There was no CD-ROM drive with this notebook.

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The intel inside logo and Pentium are registered trademarks and MMX is a trademark of Intel Corporation.

Results and specifications: Notebooks under \$4,000

Product	NEC Discovery 713L	Tech Star Voyager 5000	Toshiba Satellite 310 CDS	Twinhead Slimnote 9
Distributor	NEC	Tech Star Distribution	Toshiba	Westan
Phone	1800 812 796	(07) 3367 1444	1800 021 100	(03) 9563 6775
Fax	(02) 9930 2175	(07) 3367 1331	(02) 9979 8193	(03) 9563 6836
Online	http://www.nec.com.au	http://www.techstar.com.au	http://www.toshiba.com.au	http://www.twinhead.com.tw
Price	\$3,990	\$3,800	\$3,700	\$3,800
SPECIFICATIONS				
Processor	Intel Pentium 133MHz MMX	Intel Pentium 233MHz MMX	Intel Pentium 200MHz MMX	Intel Pentium 200MHz MMX
Secondary cache (K)	512	256	256	256
Tested/maximum RAM (M) and type	32/80 EDO	32/80 EDO	32/160 EDO	32/128 EDO
Hard disk drive	2.1G EIDE Hitachi	2.2G EIDE Toshiba	2.1G EIDE Toshiba	2.1G EIDE Hitachi
Hard disk controller	UltraDMA	Mode 4 EIDE	Mode 4 EIDE	Mode 4 EIDE
Hard disk file system	FAT	FAT32	FAT	FAT
Video bus type	PCI	PCI	PCI	PCI
Video RAM	2M EDO	2M DRAM	2M EDO	2M EDO
Video controller chip	NeoMagic MagicGraph 128XD	Chips and Technologies 65555	Chips and Technologies 65555	Chips and Technologies 65554 PCI
Tested resolution/colour depth/refresh rate	800 by 600/256/60MHz	800 by 600/256/60MHz	800 by 600/256/60MHz	800 by 600/256/60MHz
Pointer device	Touchpad	Touchpad	Trackpoint	Touchpad
Dimensions (cm) (H by W by D)	4.3 by 24.8 by 30.6	5.7 by 24.3 by 30.3	5.7 by 24.2 by 30.4	4.9 by 23.5 by 29.7
Bare minimum weight (kg)	2.7	2.4	3	3.4
Travel weight (kg)	3.2	2.9	3.3	3.8
PC Card slot type	2 Type II or 1 Type III	2 Type II or 1 Type III	2 Type II or 1 Type III	2 Type II or 1 Type III
Port replicator	\$229	\$280	No	\$260
Docking station	No	No	No	No
CD-ROM drive	20x	20x	16x	20x
Tested CD-ROM controller/cache setting	ATAPI/Windows	ATAPI/Windows	ATAPI/Windows	ATAPI/Windows
Soundcard	Yamaha	ESS	Yamaha OPL3	Yamaha
Modem	No	No	No	Optional 56K \$360
Display	12.1in dual scan	12.1in active matrix TFT	12.1in dual scan	12.1in active matrix TFT
Maximum internal resolution by no. of colours	800 by 600 by 256K	800 by 600 by 16 million	600 by 800 by 256	800 by 600 by 16 million
Maximum external resolution by no. of colours	640 by 480 by 16 million	1,024 by 768 by 64K	1,024 by 768 by 256	1,280 by 1,024 by 256
Manufacturer-claimed battery life (hours:minutes)	Up to 3:00	3:40	Over 2:40	2:35
APC Labs-tested BatteryMark 2.0 (hours:minutes)	2:32	1:17	2:42	3:02
Battery type	Lithium ion	Lithium ion	Lithium ion	NiMH
Carry case included in price	Yes	Yes	No	Yes
Operating systems available	Windows 95	Windows 95/NT	Windows 95	Windows 95
Warranty terms	3 years limited RTB parts and labour, local	2 years RTB parts and labour, limited international	1 year RTB parts and labour, local and international	2 years RTB parts and labour, local
BENCHMARK RESULTS				
Business Winstone 98	11.8	12.2	12.6	13.7
Business Disk WinMark 98	692	719.7	779	768
High-End Disk WinMark 98	1,780	1,796.70	1,946.70	2,023.30
Business Graphics WinMark 98	43.7	62.2	68	67.7
High-End Graphics WinMark 98	N/A ⁵	N/A ⁵	N/A ⁵	N/A ⁵
CPUmark32	323	321.7	349	384.7
CD-ROM WinMark 98	1,070	793.7	907	957

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3. These tests were performed without independent verification by Ziff-Davis and Ziff-Davis makes no representations as to the results.

4. To test the battery we had APM enabled on all notebooks. All power-saving features were disabled.

5. Notebooks require an internal resolution of 1,024 by 768 to run this test.

6. There was no CD-ROM drive with this notebook.

Results and specifications: Business notebooks

Product	Acer Extensa 390CX	Dell Latitude CP M166ST	Digital HiNote VP725	Gateway Solo 2300LS	IBM ThinkPad 380D
Distributor	Acer Computer	Dell Computer	Digital	Gateway 2000	IBM
Phone	(02) 9870 1999	1800 808 312	132 393	1800 500 734	132 426
Fax	(02) 9778 6227	1800 818 341	(02) 9561 7555	(02) 9641 2660	(02) 9354 7766
Online	http://www.acer.com.au	http://www.dell.com.au	http://www.digital.com.au	http://www.gw2k.com.au	http://www.au.pc.ibm.com
Price	\$3,999	\$3,959	\$6,650	\$4,299	\$5,072
SPECIFICATIONS					
Processor	Intel Pentium 233MHz MMX	Intel Pentium 166MHz MMX	Intel Pentium 200MHz MMX	Intel Pentium 200MHz MMX	Intel Pentium 150MHz MMX
Secondary cache (K)	256	256	512	256	256
Tested/maximum RAM (M) and type	48/128 EDO	32/128 EDO	32/144 SDRAM	32/192 SDRAM	32/80 DRAM
Hard disk drive	3.2G EIDE IBM	1.6G EIDE IBM	3.2G EIDE IBM	2G EIDE IBM	2.1G EIDE IBM
Hard disk controller	Mode 4 EIDE	Mode 4 EIDE	Mode 4 EIDE	Mode 4 EIDE	Mode 4 EIDE
Hard disk file system	FAT32	FAT	FAT	FAT	FAT
Video bus type	PCI	PCI	PCI	PCI	PCI
Video RAM	2M EDO	2M EDO	2M VRAM	2M EDO	2M EDO
Video controller chip	Chips and Technologies 65555	NeoMagic MagicGraph 128XD	NeoMagic MagicGraph 128XD	NeoMagic MagicGraph 128XD	NeoMagic MagicGraph 128XD
Tested resolution/colour depth/refresh rate	800 by 600/256/60MHz	800 by 600/256/60MHz	1,024 by 768/256/60MHz	800 by 600/256/60MHz	800 by 600/256/60MHz
Pointer device	Touchpad	Touchpad	Touchpad	Touchpad	Trackpoint
Dimensions (cm) (H by W by D)	4.7 by 24.2 by 31	3.9 by 24.2 by 30.5	5.2 by 23.9 by 30.4	4.6 by 23.2 by 28.8	6 by 22.8 by 29.9
Bare minimum weight (kg)	3	2.6	3.5	3.2	3.1
Travel weight (kg)	3.7	3.4	3.8	3.9	3.5
PC Card slot type	2 Type II or 1 Type III	2 Type II or 1 Type III	2 Type II or 1 Type III	2 Type II or 1 Type III	2 Type I/II or 1 Type III
Port replicator	\$295	\$529	\$250	\$299	\$470
Docking station	No	\$1,199	No	\$999	No
CD-ROM drive	20x	20x	20x	20x	8x
Tested CD-ROM controller/cache setting	ATAPI/Windows	ATAPI/Windows	ATAPI/Windows	ATAPI/Windows	ATAPI/Windows
Soundcard	Yamaha	Crystal	Sound Blaster Pro compatible	Yamaha 16-bit	Sound Blaster Pro
Modem	Optional 56K \$412	Optional 56K \$265	No	Optional 33.6K \$279	No
Display	12.1in active matrix TFT	12.1in active matrix TFT	13.3in active matrix TFT	12.1in active matrix TFT	12.1in active matrix TFT
Maximum internal resolution by no. of colours	800 by 600 by 16.7 million	800 by 600 by 16 million	1,024 by 768 by 64K	800 by 600 by 64K	800 by 600 by 64K
Maximum external resolution by no. of colours	1,024 by 768 by 64K	1,024 by 768 by 64K	1,280 by 1,024 by 256	1,280 by 1,024 by 256	1,024 by 768 by 256
Manufacturer-claimed battery life (hours:minutes)	Over 4:00	2:30 to 5:00	2:54	5:00	2:35
APC Labs-tested BatteryMark 2.0 (hours:minutes)	5:01	1:55	2:52	6:17	2:52
Battery type	Lithium ion	Lithium ion	Lithium ion	Lithium ion	Lithium ion
Carry case included in price	No	Yes	Yes	Yes	No
Operating systems available	Windows 95	Windows 95/NT dual boot	Windows 95/NT	Windows 95	Windows 95
Warranty terms	3 years RTB parts, 1 year labour, international	3 years RTB (first year onsite) parts and labour, international	3 years RTB parts and labour, international	3 years RTB parts and labour, local	1 year RTB parts and labour, international
BENCHMARK RESULTS					
Business Winstone 98	15.3	13.2	15.5	13.5	11.9
Business Disk WinMark 98	882.7	748.7	883.3	754.7	775
High-End Disk WinMark 98	2,400	2,003.3	2,386.7	1,950	1,960
Business Graphics WinMark 98	84.1	72.5	81.8	79.4	53.7
High-End Graphics WinMark 98	N/A ⁵	N/A ⁵	111	N/A ⁵	N/A ⁵
CPUMark32	402.3	342	430.7	384	312.7
CD-ROM WinMark 98	1,006.7	967.7	944	954.7	700

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4. To test the battery we had APM enabled on all notebooks. All power-saving features were disabled.

5. Notebooks require an internal resolution of 1,024 by 768 to run this test.

6. At the time of going to print, Pearl Computer did not have a Web site.

Results and specifications: Business notebooks

Product	NEC Versa 2780MT	Pearl 6400T	Toshiba Satellite 480CDT	Twinhead Slimnote EX
Distributor	NEC	Pearl Computer	Toshiba	Westan
Phone	1800 812 796	(02) 9440 8855	1800 021 100	(03) 9563 6775
Fax	(02) 9930 2175	(02) 9440 8966	(02) 9979 8193	(03) 9563 6836
Online	http://www.nec.com.au	N/A ⁶	http://www.toshiba.com.au	http://www.twinhead.com.tw
Price	\$6,945	\$3,620	\$6,482	\$5,500
SPECIFICATIONS				
Processor	Intel Pentium 233MHz MMX	Intel Pentium 200MHz MMX	Intel Pentium 233MHz MMX	Intel Pentium 233MHz MMX
Secondary cache (K)	512	512	256	512
Tested/maximum RAM (M) and type	32/128M EDO	32/64 EDO	32/160 EDO	32/128 SDRAM
Hard disk drive	2.1G EIDE	2.1G Hitachi Ultra DMA-33	4G EIDE Toshiba	4G EIDE Hitachi
Hard disk controller	Mode 4 EIDE	UltraDMA	Mode 4 EIDE	Mode 4 EIDE
Hard disk file system	FAT	FAT 32	FAT	FAT32
Video bus type	PCI	PCI	PCI	PCI
Video RAM	2M EDO	2M EDO	2M EDO	2M SGRAM
Video controller chip	NeoMagic MagicGraph 128XD	Trident 9660	Chips and Technologies 65555	Trident Cyber 9397
Tested resolution/colour depth/refresh rate	800 by 600/256/60MHz	800 by 600/256/60MHz	800 by 600/256/60MHz	1,024 by 768/256/60MHz
Pointer device	Touchpad	Touchpad	Trackpoint	Touchpad
Dimensions (cm) (H by W by D)	5.3 by 24.4 by 30.5	5.8 by 23.6 by 30.2	5.3 by 24.2 by 30.2	5.1 by 24.4 by 30.7
Bare minimum weight (kg)	3.3	3.7	3.1	3.5
Travel weight (kg)	3.7	4.3	4	3.8
PC Card slot type	2 Type II or 1 Type III	2 Type II or 1 Type III	2 Type II or 1 Type III	2 Type II or 1 Type III
Port replicator	\$294	\$253	No	\$260
Docking station	No	No	No	No
CD-ROM drive	20x	20x	16x	20x
Tested CD-ROM controller/cache setting	ATAPI/Windows	ATAPI/Windows	ATAPI/Windows	ATAPI/Windows
Soundcard	16-bit Sound Blaster Pro audio compatible	ESS	Yamaha OPL3	ESS
Modem	Yes, integrated 56K	No	No	Optional 56K \$360
Display	12.1in active matrix TFT	12.1in active matrix TFT	12.1in active matrix TFT	13.3in active matrix TFT
Maximum internal resolution by no. of colours	800 by 600 by 64K	640 by 480 by 16 million	600 by 800 by 256K	1,024 by 768 by 16 million
Maximum external resolution by no. of colours	640 by 480 by 16 million	640 by 480 by 16 million	1,024 by 768 by 156K	1,024 by 768 by 16 million
Manufacturer-claimed battery life (hours:minutes)	Up to 4:00	1:30	Over 2:40	3:00
APC Labs-tested BatteryMark 2.0 (hours:minutes)	2:41	1:31	2:32	3:52
Battery type	Lithium ion	NIMH	Lithium ion	Lithium ion
Carry case included in price	Yes	Yes	No	Yes
Operating systems available	Windows 95	Windows 95	Windows 95	Windows 95
Warranty terms	3 years limited RTB parts and labour, local	2 years RTB parts and labour, international	1 year RTB parts and labour, international	2 years RTB parts and labour, local
BENCHMARK RESULTS				
Business Winstone 98	15.6	8.7	13.4	15.7
Business Disk WinMark 98	753.7	606.7	841.3	868.7
High-End Disk WinMark 98	2,066.7	1,336.7	2,160	2,293.3
Business Graphics WinMark 98	89.1	39.2	74.9	84.4
High-End Graphics WinMark 98	N/A ⁵	N/A ⁵	N/A ⁵	110
CPUmark32	462.3	259.3	371.3	457.3
CD-ROM WinMark 98	941	796.7	895	954.7

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The Essential Desktop for Scientists and Engineers

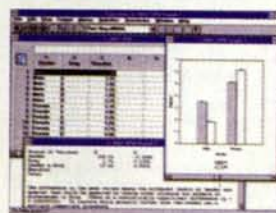


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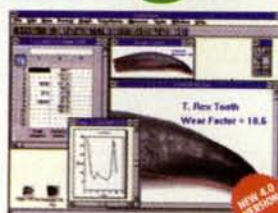
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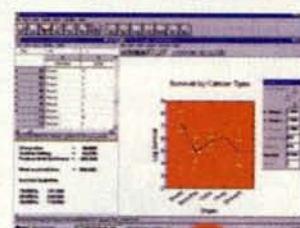


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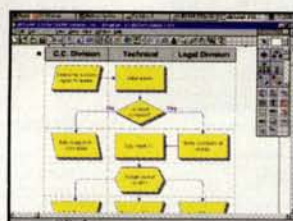


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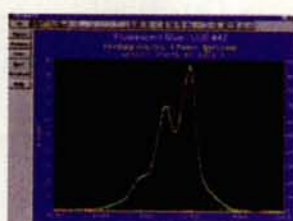
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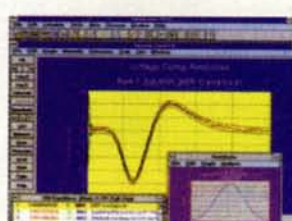
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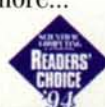
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Results and specifications: Slimline notebooks

Product	Digital HiNote Ultra 2000 GTX5166	Gateway Solo 5100	IBM ThinkPad 560E	Leo DesigNote 6000	NEC Versa 5060MX
Distributor	Digital	Gateway	IBM	First International Computer	NEC
Phone	132 393	1800 500 734	132 426	(02) 9870 8077	1 800 812 796
Fax	(02) 9561 7555	(02) 9641 2660	(02) 9354 7766	(02) 9870 8177	(02) 9930 2175
Online	http://www.digital.com.au	http://www.gwk2.com.au	http://www.au.pc.ibm.com	http://www.fic.com.tw	http://www.nec.com.au
Price	\$8,740	\$5,199	\$4,171	\$5,899	\$7,695
SPECIFICATIONS					
Processor	Intel Pentium 166MHz MMX	Intel Pentium 200MHz MMX	Intel Pentium 166MHz MMX	Intel Pentium 233MHz MMX	Intel Pentium 166MHz MMX
Secondary cache (K)	512 K	512K	256K	512K	256K
Tested/maximum RAM (M) and type	32M Windows 9532/144 EDO	32/144 SDRAM	16/80 DRAM	32/96 EDO	32/80 EDO
Hard disk drive	2.1G IDE IBM	2G EIDE IBM	2.1G EIDE IBM	1.6G EIDE IBM	3G EIDE Houdini
Hard disk controller	Mode 4 EIDE	Mode 4 EIDE	Mode 4 EIDE	Mode 4 EIDE	Mode 4 EIDE
Hard disk file system	FAT32	FAT	FAT	FAT	FAT
Video bus type	PCI	PCI	PCI	PCI	PCI
Video RAM	2M VRAM	2M EDO	2M VRAM	2M EDO	2M EDO
Video controller chip	Chips and Technologies 65554	Chips and Bits 65555	Cyber 9385/82	NeoMagic MagicGraph 128XD	NeoMagic MagicGraph 128XD
Tested resolution/colour depth/refresh rate	1,024 by 768/256/60MHz	1,024 by 768/256/60MHz	800 by 600/256/60MHz	1,024 by 768/256/60MHz	1,024 by 768/256/60MHz
Pointer device	Touchpad	Touchpad	Trackpoint	Touchpad	Touchpad
Dimensions (cm) (H by W by D)	3.7 by 25 by 30.5	4 by 24.7 by 31.3	3.2 by 22.2 by 29.7	4.2 by 24.8 by 31	4 by 24.8 by 30.6
Bare minimum weight (kg)	3	2.9	1.9	2.6	2.6
Travel weight (kg)	3.6	3.6	2.6	3.4	3.2
PC Card slot type	2 Type II or 1 Type III	2 Type II or 1 Type III	2 Type II or 1 Type III	2 Type II or 1 Type III	2 Type II or 1 Type III
Port replicator	\$310	\$299	\$260	\$342	\$360
Docking station	\$1,390	\$999	No	No	No
CD-ROM drive	20x	20x	Optional \$786	20x	20x
Tested CD-ROM controller/cache setting	ATAPI/Windows	ATAPI/Windows	ATAPI/Windows	ATAPI/Windows	ATAPI/Windows
Soundcard	Sound Blaster	ESS	Sound Blaster Pro	Yamaha	16-bit Sound Blaster Pro compatible
Modem	56K	Optional 56K	No	No	Optional 56K
Display	14.1in active matrix TFT	14.1in active matrix TFT	12.1in active matrix TFT	13.3in active matrix TFT	13.3in active matrix TFT
Maximum internal resolution by no. of colours	1,024 by 768 by 64K	1,024 by 768 by 262	800 by 800 by 65K	1,024 by 768 by 64K	1,024 by 768 by 65K
Maximum external resolution by no. of colours	1,280 by 1,024 by 256	1,280 by 1,024 by 256	1,280 by 1,024 by 256	1,024 by 768 by 64K	640 by 480 by 16 million
Manufacturer-claimed battery life (hours:minutes)	4:30	4:00	2:30	3:00	Up to 2:30
APC Labs-tested BatteryMark 2.0 (hours:minutes)	3:25	2:07	2:40	2:51	1:37
Battery type	Lithium ion	Lithium ion	Lithium ion	Lithium ion	Lithium ion
Carry case included in price	Yes	Yes	No	Yes	Yes
Operating systems available	Windows 95/NT	Windows 95	Windows 95	Windows 95	Windows 95
Warranty terms	3 years RTB parts and labour, international	3 years RTB parts and labour, local	1 year RTB parts and labour, international	2 years RTB parts and labour, local	3 years limited RTB parts and labour, local
BENCHMARK RESULTS					
Business Winstone 98	12.2	14.1	9.9	13.9	11.8
Business Disk WinMark 98	771.3	800	740.3	710.7	748
High-End Disk WinMark 98	1,999.3	2,100	1,843.3	1,946.7	1,890
Business Graphics WinMark 98	59.4	78.1	49.1	72.9	60.7
High-End Graphics WinMark 98	81.7	109	N/A ⁵	107	78.3
CPUmark32	354	424.3	331.7	440.7	326.7
CD-ROM WinMark 98	1,023.3	964.3	N/A ⁶	1,070	1,020

1. All products used in these tests are shipping versions available to the public at the time of publication unless otherwise stated.

2. Winstone, WinBench and associated programs are registered trademarks of the Ziff-Davis Publishing Company.

3. These tests were performed without independent verification by Ziff-Davis and Ziff-Davis makes no representations as to the results.

4. To test the battery we had APM enabled on all notebooks. All power-saving features were disabled.

5. Notebooks require an internal resolution of 1,024 by 768 to run this test.

6. There was no CD-ROM drive with this notebook.

Results and specifications: Power notebooks

Product	Acer TravelMate 7100TE	Dell Inspiron 3200	Digital HiNote VP 745	Gateway Solo 9100XL	IBM ThinkPad 770	NEC Versa 6260
Distributor	Acer Computer	Dell Computer+C34+C1	Digital	Gateway	IBM	NEC
Phone	(02) 9870 1999	1800 808 312	132 393	1800 500 734	132 426	1800 812 796
Fax	(02) 9878 6227	1800 818 341	(02) 9561 7555	(02) 9641 2660	(02) 9354 7766	(02) 9930 2175
Online	http://www.acer.com.au	http://www.dell.com.au	http://www.digital.com.au	http://www.gw2k.com.au	http://www.au.pc.ibm.com	http://www.nec.com.au
Price	\$8,799	\$5,539	\$8,200	\$8,499	\$10,305	\$10,159
SPECIFICATIONS						
Processor	Intel Pentium 266MHz MMX	Intel Pentium II 266MHz	Intel Pentium 266MHz MMX	Intel Pentium II 266 MHz	Intel Pentium 233MHz MMX	Intel Pentium 266MHz MMX
Secondary cache (K)	512K	512K	512K	512K	512K	512K
Tested/maximum RAM (m) and type	128/128 SDRAM	32/144 SDRAM	32/144 SDRAM	64/192 SDRAM	32/256	64/128 EDO
Hard disk drive	4G EIDE IBM	3.2G EIDE IBM	4.1G EIDE IBM	5G	5.1G EIDE IBM	5.1G EIDE NEC
Hard disk controller	Mode 4 EIDE	Mode 4 EIDE	Mode 4 EIDE	UltraDAM	Mode 4 EIDE	Mode 4 EIDE
Hard disk file system	FAT32	FAT	FAT	FAT	FAT	FAT
Video bus type	PCI	PCI	PCI	PCI	PCI	PCI
Video RAM	2M EDO	2M EDO	2M VRAM	4M SGRAM	2M EDO	2M DRAM
Video controller chip	NeoMagic MagicGraph 128XD	NeoMagic MagicGraph 128XD	NeoMagic MagicGraph 128XD	Trident Cyber 9397	Trident Cyber 9397	NeoMagic MagicGraph 128XD
Tested resolution/colour depth/refresh rate	1,024 by 768/256/60MHz	1,024 by 768/256/60MHz	1,024 by 768/256/60MHz	1,024 by 768/256/60MHz	1,024 by 768/256/60MHz	1,024 by 768/256/60MHz
Pointer device	Touchpad	Touchpad	Touchpad	Touchpad	Trackpoint	Touchpad
Dimensions (cm) (H by W by D)	5.6 by 25 by 31.4	5 by 23.4 by 30.3	5.4 by 23.8 by 30.3	5.5 by 24.2 by 31.3	5.8 by 25.5 by 31.4	5.8 by 25.1 by 29.7
Bare minimum weight (kg)	3.6	3.1	3.4	4	3.6	3.3
Travel weight (kg)	4.4	3.7	3.8	4.4	4.5	3.6
PC card slot type	2 Type II or 1 Type III	2 Type II or 1 Type III	2 Type II or 1 Type III	2 Type II or 1 Type III	2 Type II or 1 Type III	2 Type II or 1 Type III
Port replicator	No	\$299	Yes \$210 ex tax	\$299	\$333	Yes \$284
Docking station	\$640	No	No	\$999	\$1,226	\$1,674
CD-ROM drive	20x	24x	20x	DVD/floppy combo	DVD (optional)	20x
Tested CD-ROM controller/cache setting	ATAPI/Windows	ATAPI/Windows	ATAPI/Windows	ATAPI/Windows	ATAPI/Windows	ATAPI/Windows
Soundcard	NeoMagic MagicGraph 128XD	Crystal 4237	Sound Blaster Pro compatible	Yamaha 16-bit	Crystal CS4237	16-bit Sound Blaster Pro audio compatible
Modem	56K	56K	No	56K	33.6K internal	56K
Display	13.3in active matrix TFT	13.3in active matrix TFT	13.3in active matrix TFT	14.1in active matrix TFT	14.1in active matrix	13.3in active matrix TFT
Maximum internal resolution by no. of colours	1,024 by 768 by 64K	1,024 by 768 by 64K	1,024 by 768 by 64K	1,024 by 768 by 64K	1,024 by 768 by 64K	1,024 by 768 by 64K
Maximum external resolution by no. of colours	1,024 by 768 by 64K	1,024 by 768 by 16Million	1,280 by 1,024 by 256	1,280 by 1,024 by 64K	1,600 by 1,200 by 256	640 by 480 by 16 million
Manufacturer-claimed battery life (hours:minutes)	Over 8:00	2:30 to 4:30	2:55	5:00	3:30	Up to 3:00
APC Labs-tested BatteryMark 2.0 (hours:minutes)	4:50	2:32	2:52	3:12	3:19	2:25
Battery type	Lithium ion	Lithium ion	Lithium ion	Lithium ion	Lithium ion	Lithium ion
Carry case included in price	No	Yes	Yes	Yes (leather)	No	Yes
Operating systems available	Windows 95/Windows NT	Windows 95	Windows 95/Windows NT	Windows 95	Windows 95	Windows 95
Warranty terms	3 years RTB and parts, 1 year labour/local & international	1 year RTB parts and labour, local	3 years RTB parts and labour, international	3 years RTB parts and labour, local	1 year express collect parts and labour, international next 2 years RTB (upgradable to express collect).	3 years limited RTB parts and labour, local
BENCHMARK RESULTS						
Business Winstone 98	15.9	18.5	16.9	20.2	16.1	17.1
Business Disk WinMark 98	858.7	924	883.3	1	050	994
High-End Disk WinMark 98	2,386.7	2,610	2,480	3,053.3	2,583.3	2,470
Business Graphics WinMark 98	86.5	101	94	109	86	94.5
High-End Graphics WinMark 98	119	135	129	132	111.3	129.3
CPU Mark32	341.7	682.3	505	689	467	508
CD-ROM WinMark 98	1,010	1,370	951	997	1,093.3	1,036.70

1. All products used in these tests are shipping versions available to the public at the time of publication unless otherwise stated.
2. Winstone, WinBench and associated programs are registered trademark of the Ziff-Davis Publishing Company.
3. These tests were performed without independent verification by Ziff-Davis and Ziff-Davis makes no representations as to the results.
4. To test the battery we had APM enabled on all notebooks. All power-saving features were disabled.

1997 Year 12

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Workshop

151 APC Magazine

CONTENTS

Welcome to Workshop, the section dedicated to bringing you all manner of tips, interesting information and do-it-yourself tutorials. Within these pages you will find useful shareware, informative operating-system-specific columns and easy-to-follow programming tutorials.

With the inevitable release of Windows 98 it seems that a certain Operating Systems column within these glorious pages may soon need to adjust. No doubt the question on the minds of avid Workshop

readers will be what the Workshop team can dig up for Windows 98. Rest assured that you'll be the first to know the many tips and hints that will certainly arise from the new features and capabilities of Windows 98, not to mention the many workarounds that are likely to be required for those features that you'd rather not have...

In the meantime be sure to check out Workshop online and let us know what you think. Send any comments, criticisms and ideas to workshop@acp.com.au.

Tech Talk

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Technobabble continues the topic of hard drives and how they work, while Step by Step shows you the finer points of hard drive partitioning.

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Windows 95 covers all the important tips for a new installation, OS/2 reveals that XFree86 isn't just the domain of Linux, Mac explains how to improve your printing and Linux examines basic X and window manager configuration.

Programming

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Developers Corner returns to the topic of Windows programming, JavaScript delves further into objects and HyperText explores database connectivity.

Shareware Summary

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All the files mentioned here can be found on this month's **apcmag.cd** in the Workshop section. If you have any Site of the Month recommendations, please send them to **workshop@acp.com.au**.



Win! Win! Win!

Workshop is on the lookout for the most interesting, strange, funny, or downright weird software bugs you can find. These include code snippets, examples of features that function poorly, or procedures for crashing a particular application. Anything and everything that is buggy deserves mention.

Send us the bug of your choice via email to bugs@acp.com.au or snail mail, and you'll be in the running to win your choice of **development or application software** prizes from Workshop's limited software collection. The prizes change each month to ensure there's always something interesting for the avid bug-hunters out there. Feel free to send screen captures or example code listings, as well as details of how to duplicate the bug, if applicable.

Winners will be announced in the August edition of APC, and the winning bug will appear in the Bug of the Month column. So start hunting!

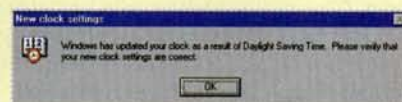


Bug of the Month

This month's bug is from Stewart Wicks.

Windows 95 thinks that daylight saving ends in Australia's eastern states on March 1. Microsoft does not consider this a bug, as it *did* end on that date in 1995. If Australia changes the date, they see no reason that the software should cope with that.

Anyway, Stewart's computer was running at 2am on the first of March and it popped up a dialog box to announce that the time had been adjusted.



Fair enough, thought Stewart. The time had been set back to 1am.

An hour later, Stewart, the hard-working guy that he is, was still working. As the clock ticked over to 2am Stewart was confronted by a familiar dialog: the time had been set back to 1am again. This seems somewhat reminiscent of the Bill Murray movie 'Groundhog Day'.

Although we're somewhat reluctant to encourage his all-night sessions, we've decided to give Stewart his prize anyway. (Besides, he was probably just playing Doom.) For his pain, Stewart wins a copy of Microsoft's Visual J++.

Michael Smith

Get involved

All files mentioned in Workshop can be found on **apcmag.cd** or downloaded from our Web site at <http://www.apcmag.com>. Here you will also find a number of online discussion forums where you can discuss technical issues or just voice your opinion on any related topic.

Don't forget that Workshop is a reader-input section. Feel free to contact us by sending any ideas, comments or criticisms you have. You can email us at workshop@acp.com.au, or send snail mail to APC Workshop, PO Box 37, Sydney NSW 1028.

Ashton Mills, Workshop editor

The second instalment in our series on hard disks. The nitty-gritty of how the hard disk works. By Nathan Taylor

Technobabble

Information on hard disks is stored in magnetic fields, segments of the disk that have either a north polarity or a south polarity. The heads of the disk are used to read and change the polarity of those segments. Simple? Well, not quite.

Unfortunately, to store bits of data, it's not as easy as defining a logical '1' as a region with one kind of polarity and a '0' as regions with the other. Hard disk heads just don't work that way. What hard disk heads do is measure *changes* in polarity, not polarity itself.

Magnetic energy travels between poles of opposite alignment (north to south or south to north); this is called *flux*. So you have two kinds of flux: north-south and south-north. What the hard disk head does is signal the hard disk circuitry when there has been a change in the direction of the flux. If the hard disk passed over two regions with south-north polarity in succession, for instance, then it would register 'no change', while if it passed over a region with south-north polarity followed by a region with north-south polarity, it would register a 'flux reversal'.

It would be handy to simply say that 'no change' equals 0, while a 'flux reversal' equals 1 (or vice versa), but here we come across another problem. For proper detection to occur, the hard disk must know the frequency at which to expect changes in flux or lack thereof.

If, for instance, you had a succession of 'no change' segments, how would the computer tell how many bits that represented? Knowing the speed at which the platter spins and the density of the regions helps the hard disk determine how many bits there are, but a long string of 'no changes' will still throw the hard disk controller out; it'll probably have trouble knowing the difference between a string of 568 'no reversals' and 569 'no reversals', for example.

To overcome this problem, encoding

methods were devised for hard disks to provide a kind of clock synchronisation for data reading and writing.

The first encoding system used was frequency modulation (FM). Simply put, for each flux reversal representing a bit of data, a flux reversal was also used to represent the clock. A '1' was represented by a flux reversal (the clock) followed by another flux reversal indicating the value (the '1'). Similarly, a '0' was represented by a flux reversal for the clock by a 'no reversal' segment for the '0'.

Obviously, just getting this clock synchronisation right produced a lot of overhead with FM encoding (it basically halved the capacity of the disk), so other methods have since been developed, and FM is no longer used at all.

The next encoding method used was modified frequency modulation (MFM). MFM improved on FM by inserting clock reversals only between consecutive zeros, drastically reducing the overhead associated with FM. Following MFM, and in use on most magnetic storage media today, was run length limited (RLL) encoding, which uses complex algorithms to reduce the number of clock bits required. Simply put, RLL puts delimiters on the minimum and maximum amount of time between clock flux reversals. It uses specific patterns of reversals to represent bits and clock ticks, which vary from hard disk to hard disk.

The most recent innovation in the area of encoding comes from Quantum, and is called partial response maximum likelihood (PRML). When the density of magnetic fields becomes too high, heads start having problems distinguishing flux reversals. PRML is designed to overcome this by using a very complex method of digital sampling which determines the most likely set of numbers represented by a group of closely packed magnetic fields. While this may seem weird, it works, and has allowed Quantum to produce disks with very high data densities, and thus high capacities.

Hard disk geometry

That's the basic idea of how data is stored on the media. Now we need to look at how that media is arranged. As explained last month, a hard disk consists of one or more circular platters which are rotated at high speeds on a central spindle. A read/write head mounted on a head actuator moves across the surface of the platter, locating and reading data.

The platters themselves are divided into regions called tracks and sectors. This segmentation exists as a means of addressing certain bits of data.

Tracks are concentric circles placed on the surface of each platter, and provide a 'stopping point' for the head when it moves across the surface of the platter. The head, for instance, may be informed that the data it desires is on track 1,441, at which point the head will move to a point above that track.

Most modern hard disks have thousands of tracks, and each track can hold thousands of bytes of data. They are numbered, starting at zero on the outside and increasing as you head towards the centre.

There seems to be some confusion about what 'cylinders' are, and how they relate to tracks. The use of the term 'cylinder' arose when manufacturers started using multiple platters in the same hard disk to increase the capacity of the disk. The platters are all connected to the same spindle and spin at exactly the same speed. To read from the multiple platters, you need multiple heads. These multiple heads are always connected to the same actuator arm and move synchronously. You can't have one head reading from track 0 of its platter while another head is located at track 500 of its platter; they all have to be at the same track.

The term 'cylinder' is used to denote aligned tracks across a number of platters, and a cylinder number is identical to that of a track. So a command to 'move heads to cylinder 200' is the same

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Cat. No. 8499 **UPS / PS Internal RUPS S'ware** \$99

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This 19" rack mountable 101 key, keyboard meets EIA 310C standard & can be put in the drawer of a 19" cabinet, or used on the desktop after the removal of mounting plates. It is enclosed in a heavy duty steel case & features embossed key frame without tactile effect but with buzzer to make sure input is effective.

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as 'move all the heads to track 200 of their respective platters'.

If tracks and cylinders were the only way you could address data, then you'd have an awful lot of wasted space on the hard disk. Small files would take up a whole track each, wasting a lot of space. For this reason, tracks are divided up into sectors, each sector consisting of 512 bytes of data (plus a few extra bytes that are used for error checking and correction, which are inaccessible to the user). Like cylinders, sectors are given a number for addressing purposes, although the number of sectors on a given track depends on the density of the magnetic zones which form bits. Sectors are the final piece of the puzzle when it comes to hard disk addressing, and combined with head and cylinder numbers, make up the address of any piece of data on the hard disk. This is the CHS (cylinder, head, sector) system; the 'head' number refers to the platter on which the data is located.

The first hard disks had a consistent number of sectors per track, which made addressing sectors easy, but caused problems in manufacturing. Why? Because the circumference of the outer tracks is much larger than that of the inner tracks. To get consistent sector sizes and numbers, manufacturers had to decrease the density of the data as you moved towards the outer edge of the platter. This wasted a lot of hard disk real estate, with the outer rings of the platter not being nearly as efficient as they could be.

For this reason, *zoned bit recording* (ZBR) was introduced. On ZBR hard disks (and all of them are, nowadays), tracks are divided into groups depending on their physical location on the hard disk. Each group, or *zone*, has a defined number of sectors per track, depending on the circumference. For instance, zone 0, com-

prising the outermost tracks of the platter, will have more sectors per track than any other zone. The number of sectors per track will obviously decrease as the zone approaches the centre of the platter. There is no set number of zones that a hard disk must have, although about 14 is typical.

In addition to making better use of the greater physical space afforded by outer tracks, ZBR also has the effect of increasing performance on outer tracks. As we've explained before in regards to CD-ROM drives, a single revolution of the hard disk covers more area on the outer rim of the disk than it does on the inner ring. With consistent bit densities, this means more data can be read from the outer tracks than the inner tracks in the course of a single revolution, thus increasing the performance of the hard disk.

There are several other sector-fiddling tricks that are currently used or have been used in the past. One of these is sector interleaving, which was once used to compensate for slow drive electronics.

At one stage, when the drive electronics were not fast enough to handle data as quickly as platters and heads could deliver them, it would often be the case that the disk would be forced to 'slip a rev' — that is, they had to stop reading data and wait for the drive electronics to complete the processing of current data. Meanwhile, the platter would continue spinning, and the head would have to wait for the sector it was up to to swing around again before it could continue reading the data.

Clever engineers overcame this by fiddling with the numbers of the sectors so that the disk didn't have to wait for a full revolution to start reading again. The sector numbers were interleaved, so that numerically successive sectors would actually be physically located several sectors

later. So sector numbering might have gone something like this: 1, 7, 2, 8, 3, 9 and so on. This way, the disk electronics only had to deal with reading every second sector, although it halved peak performance levels (or reduced them to a third, or a quarter, depending on the level of interleaving used).

While interleaving is no longer used, because the circuits in hard drives are now capable of handling linear sector numbering, another sector numbering methodology is commonly used to deal with some of the problems associated with track-to-track seek latency.

Say a file were big enough to span multiple tracks, and all the sectors were aligned with sectors of the same number on other tracks — so sector 0 on track 0 was adjacent to sector 0 on track 1. When the hard disk had read through all the sectors on track 1 (so the head was located just after the final sector on track one), and had to move to track two, it would just move across tracks and be right there on sector 0, ready to read the next bit of information, right? The problem is that moving the head takes time, and by the time the head moves across track 2, the rotation of the disk has carried track 2, sector 0 right past the head, and the disk has to complete an entire revolution before sector 0 to come around again.

Cylinder skew overcomes this by taking into account the time it takes to move the head between tracks, and places sectors on subsequent tracks a bit further around the platter. So sector 0 on track 2, for instance, might be adjacent to sector 12 on track 1, overcoming this problem. Pretty clever, isn't it?

Next month: A look at heads and interface technologies, and why they are so important to the performance and capacity of the hard disk

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The fine art of drive partitioning.

By Daniel Rutter

Step by Step

Most IBM-compatible computers run one, and only one, operating system. But where's the fun in that?

If you feel a hankering to set up two or more operating systems on your computer — perhaps Windows 95 and NT, or Windows 95 and Linux, or Linux and OS/2 and MS-DOS and NetBSD and OS/9 — you'll probably need to know about multiformat partitioning. Different operating systems often use different disk formats, and even if they're compatible with the same disk format, they don't necessarily work when they're all installed on the one partition.

Step-by-step instructions on setting up a machine for all the weird and wonderful possible combinations of operating systems would take a while, so this month's article is more of a general guide than a recipe.

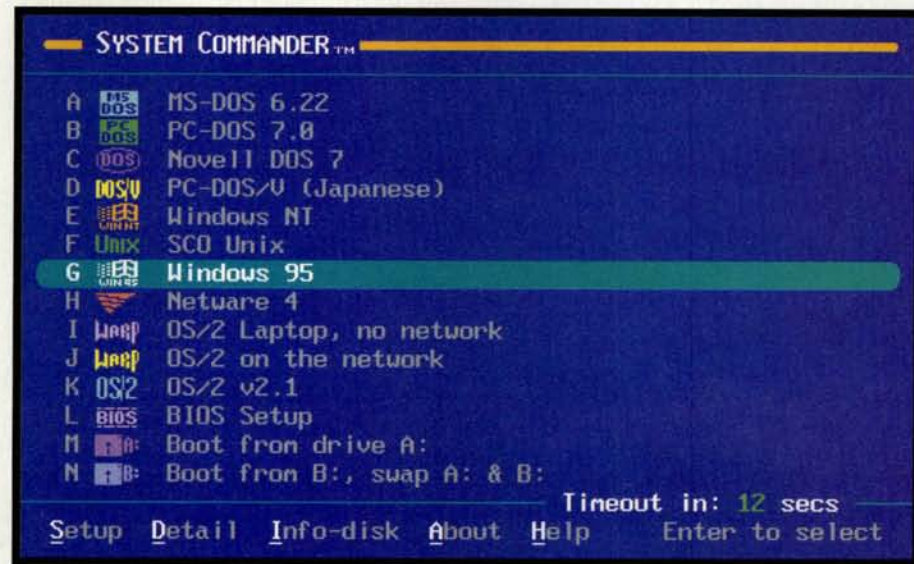
The basics

A partition is a section of the hard drive which behaves, as far as the user is concerned, like a whole separate drive unto itself. It's still really just part of another drive, so you can't copy data from one partition to another as fast as you can from one real drive to another.

Ignoring performance considerations, though, a separate partition might as well be a real separate drive. A 4G drive can have, say, three partitions adding up to its total capacity but referred to by the computer as C:, D: and E:. Partitions are useful for two basic reasons: they get around the drive size limitations of older operating systems, and they let you have multiple, differently formatted 'drives' on one physical hard drive.

The hard disk partition table — the little chunk at the beginning of the disk that tells the computer where partitions begin and end — has room for only four 'primary' partitions. If you want more than four partitions on one physical disk, you have to designate one of these primary partitions as an 'extended' partition which lets you subdivide it into 'logical' partitions. Your first hard drive must have at least one primary partition, but subsequent drives can have only extended partitions if you wish.

Other operating systems get around



this inelegant limitation by using different kinds of partition tables. They generally still need a basic MS-DOS-style partition table on the first active partition, however, that points to their own partition information. It's this sort of thing that causes people to be so rude when they talk about the backward compatibility of IBM compatible computers.

Getting back to the antiquated MS-DOS partitioning system — which is probably what you're going to end up using — primary partitions are named before extended partitions. If you have two hard drives, each containing a primary and two extended partitions, the primary partition on the first drive is C:, the primary partition on the second drive is D:, then the extended partitions on the first drive are E: and F: and the extended partitions on the second drive are G: and H:. This is a point to remember for multidrive OS installations, if you add or remove drives. If you add another hard drive with a primary partition on it, it'll push all of your drive letters along one, and OSes on re-lettered drives will probably stop working.

Shuffling systems

When you have multiple operating systems installed, the only elegant way to boot the one you want is to use a 'boot

manager' of some description. OSes can only be booted from a primary partition; the one to boot is marked as 'active' in the partition table. Boot managers get around this by residing on a primary, active partition themselves, making it possible for OS components on different partitions to load.

Probably the best of the currently available boot managers is V Communications' System Commander. It supports all of the popular operating systems, and even lets you run Windows, OS/2 and DOS from the same primary FAT (MS-DOS format) partition. You make your partitions, install your first OS, and then install System Commander. Then, when you install more OSes, System Commander automatically detects them and adds them to its menu.

Setting it up

Rearranging partitions used to be a painful exercise. If you had a 600M and a 400M partition, for instance, and wanted to change their sizes, you had to back up all of your data, delete the partitions, repartition the drive, reformat the partitions, and restore your data. Fortunately, modern partition management software, like Powerquest's very popular Partition Magic, lets you create, remove, squeeze and stretch partitions at will — although, of course, you can't make a partition

Partitioning glossary

Active Partition The active partition on a disk is the one the computer will try to boot from. Only one partition per drive can be marked active at any one time.

ATA Advanced Technology Attachment, another term for IDE. Not to be confused with EIDE.

BIOS Basic Input/Output System, the clunky old 16-bit ROM code that governs the very start of the booting process in most IBM-compatible PCs.

EIDE Enhanced Integrated Drive Electronics, a more advanced form of IDE. Modern 'IDE' drives are actually EIDE, which for most people's purposes is as good as SCSI.

IDE Integrated Drive Electronics, the old-style PC drive interface that has the advantage that it requires no controller hardware in the PC, as every drive has a controller onboard. It has various limitations compared with SCSI and EIDE. For instance, IDE drives must have a boot partition completely within the first 1,024 cylinders of the disk. If the boot partition is larger than this and files that the BIOS wants to read during booting are moved out of the first 1,024 cylinders, the machine will fail to boot.

SCSI Small Computer System Interface, the connection system that has done all along what EIDE is only now attempting. SCSI allows devices other than hard drives — such as scanners and tape backups — to be connected. EIDE provides some broadly similar features, but lacks SCSI's standardisation and performance.

smaller than the size of the data it contains.

Every OS also comes with its own program for creating and deleting partitions, usually inventively called FDISK. Without a program like Partition Magic, you have to use an operating system's own FDISK to make the partition that operating system will reside on, unless the OS manual explicitly says the MS-DOS FDISK is sufficient. MS-DOS FDISK only writes the MS-DOS System ID to partitions it creates. The System ID is a one-byte code in the partition table which identifies each partition's allegiance. A

dedicated FDISK for a particular OS will write the correct System ID.

Current Microsoft OSes cohabit well on the one machine. Dual-installing Windows 95 and Windows NT is easy enough — all you have to do is install Windows 95, and then install NT on the same partition, and NT will automatically detect Windows 95 and set up a boot menu. Microsoft OSes are, however, less flexible in their installation options than OS/2 or Linux, the next most popular choices. MS-DOS has to be installed on C:. Windows 95's boot files must also be on C:, although its data files can be elsewhere. Windows NT has to install a loader on your first FAT partition. Conversely, OS/2 and Linux don't force the issue and can be installed anywhere.

Using Partition Magic gets you around the multiple-FDISKs problem. It can build all of your partitions, specifying what kind they should be. With the help of a good boot manager like System Commander it gets even simpler; make the partitions,

install your Microsoft must-be-on-C OS (assuming you want to install a Microsoft OS), then install System Commander and keep installing OSes, and System Commander adds each new OS to its menu automatically as you go.

The only trick here applies to those who want Windows 95 and MS-DOS 6 as well. If you installed DOS 6 as your first OS, installing System Commander and then Windows 95 will prevent System Commander from booting, until you boot from a DOS 6 floppy and run the SCIN program in the System Commander directory.

Overall, setting up multiple OSes is becoming easier and easier, even as the number of 'sensible' operating systems for average IBM-compatible folks to use drops. As things stand, it's Windows 95 for the masses, Windows NT for the power users, and MS-DOS for the hardy traditionalists. Fortunately, Linux is going great guns, and recent versions are becoming almost user-friendly. ■

Popular file systems at a glance

Ext2 Linux, the most popular PC Unix OS, uses this format for its partitions. Linux partitions have the odd property of being invisible to other operating systems. OS/2 will see, for instance, an NTFS partition as a drive it cannot access, but will not perceive the existence of Ext2 partitions at all.

FAT Also known as FAT16, this is the old-fashioned MS-DOS file system, now definitely showing its age and supplanted by FAT32. FAT doesn't support partitions larger than 2G, and on partitions larger than 512M it uses space very inefficiently. A FAT partition of 1G or greater allocates space in 32K blocks (or 'clusters'), so that even the tiniest of files uses 32K of disk space, and every file wastes an average of 16K.

FAT partitions can only have 512 entries in their root directory; and long filenames, as they are implemented by Windows 95's 'VFAT', take up more than one entry. This is because the extra text is stored as a series of linked directory entries: one entry for the standard DOS 'eight dot three' character filename, and then another entry for every 13 characters in the long name.

FAT32 The file system that was introduced with the OSR2 release of Windows 95 (Version 4.00.950 B). It's like FAT, except it can handle partitions of up to 2T (almost 2,200G), and uses smaller clusters — only 4K on drives smaller than 8G. Windows NT does not yet support FAT32, although apparently Version 5 will.

HPFS The file system used by IBM's now-defunct OS/2. Windows NT 3.51 supported HPFS, but Version 4.0 does not, unless you upgraded from 3.51 or manually installed the 3.51 driver.

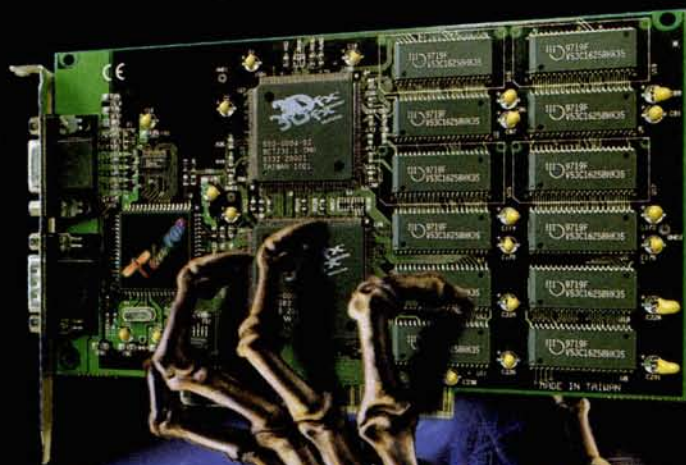
NTFS Windows NT's favourite file system. NTFS is a proper file system with access permissions and security features and lots of other stuff that average users don't need. Windows NT comes with a FAT16-to-NTFS converter, inventively named 'Convert'; from the command line just type: convert [drive letter]: /fs:ntfs. This only works one way; you can't re-FAT NTFS partitions. If you tell Convert to convert your system partition, it'll happen the next time you reset the computer.

The Windows NT system partition must reside entirely within the first 7.8G of a drive. If your NT boot partition is bigger than this and system files are moved beyond the first 7.8G (by disk defragmentation, for example), NT won't be able to boot.

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Top tips for tackling a new Windows 95 installation. **By Kieran McNamee**

Windows 95

Setting up a Windows 95 machine is not always a once-only affair. Whether it is because you have purchased a new PC, you are making a clean start on a tired and bedraggled hard drive, or you are assisting a new user, there will be many times when the process of setting up a Windows 95 machine is relived.

First, the basics

Before rushing into things we must do a small but important task: setting up the monitor for optimal viewing. A resolution of 800 by 600 or 1,024 by 768 is best, depending on your monitor size and the capability of your video card. Simply click to Desktop Properties and set your desired resolution. If you're using Windows 95B you'll also be able to specify an optimal refresh rate under Properties for the video card under Settings, Control Panel, System.

Now that we can see everything more clearly, the next step is to remove that annoying network log-on dialog you see once you've installed networking support. Make sure that there is no password entered in Passwords under the Control Panel and then, under Properties of the Network Neighbourhood icon, change 'Primary network logon' to 'Windows logon'. All network connections will be restored during bootup, but the log-on dialog will no longer be displayed.

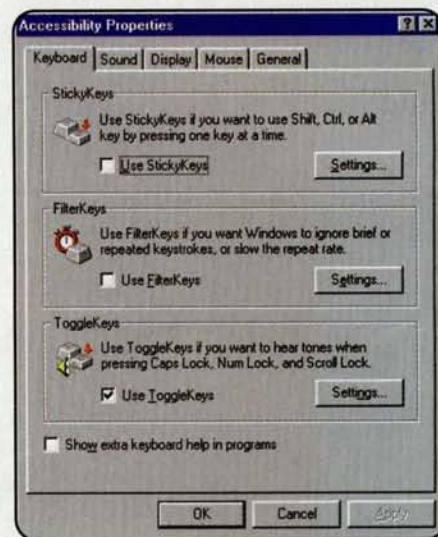
Next comes power saving. Many PC components have the ability to power down after a certain length of inactivity. Now, we're all for saving the environment, but we must consider our own sanity when setting the time period before the hard drive takes a rest. Waking up a component that has powered down is incredibly slow, so an inactive period of at least an hour should be chosen. These settings can be changed by selecting Power from the Control Panel.

The next tip concerns menu organisation, something most users overlook because of the effort involved. Once you start installing numerous applications you'll soon notice that drilling down into multiple submenus can become a little cluttered. Keep this in mind when installing applications, and don't just accept the default folder or the default desktop location. Use Settings, Taskbar, Advanced to move frequently-used programs to the topmost menu, so you can access them without drilling into submenus. Keep all applications of a particular type in their own menu, such as browsers and FTP programs under 'Internet' or all games under 'Games'. You'll be surprised at the difference it makes.

And the last of the basics is that annoying 'Windows 95 . . .' pause every time your machine boots up. Open up MSDOS.SYS in Notepad and add BootDelay=0. Now Windows 95 will get straight onto loading, rather than pausing to tell you that it's loading.

Keeping up-to-date

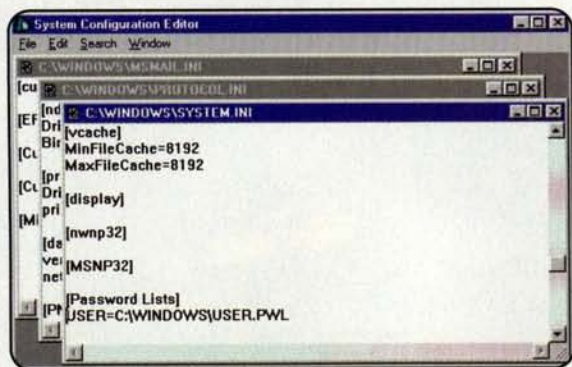
We all know that Windows 95 is not a perfect OS. In an attempt to remedy this, Microsoft has released a service pack which updates Windows 95. Installing this update before you really begin using the computer will be of great



benefit. For your convenience, you will find the latest service pack for Windows 95 on **apcmag.cd**. Simply click and install!

Similarly, it's very important that the latest drivers for all your equipment are installed; don't settle for the default Windows 95 ones. More often than not the newer drivers will provide better support or performance than those shipped with Windows 95. Be sure to visit the home pages of the manufacturers for your peripherals and download the latest drivers. Look for video, sound, CD-ROM, modem, network and printer drivers. For the gamers out there, don't forget to install the latest DirectX and associated drivers.

Lastly, it's time to update your old CONFIG.SYS and AUTOEXEC.BAT files to live in harmony with Windows 95. Unless you know you need to load certain 16-bit drivers, you can delete your CONFIG.SYS. You don't need it anymore, and Windows 95 will perform better without it. For your AUTOEXEC.BAT, delete everything but your chosen path and any required environment variables. Once that's cleaned up, you're well on your way to a finely tuned system.



Getting down and dirty

Now we come to the more important and complicated adjustments for your new Windows 95 system. These tips will provide a considerable improvement in performance and are recommended for all Windows 95 machines, newly installed or not.

By default, Windows 95's virtual memory will be set up with a swap file size managed by the system. You can improve performance, and reduce disk thrashing, by forcing the swap file to be a fixed size. A good all-round size for most systems is a maximum and minimum swap file size of 64M. If you play OpenGL

To set the cache to 4M, replace 8192 with 4096.

And if you're someone who considers aesthetics important (given Themes and the Plus expansion pack, it's safe to say Microsoft does), then you'll like this next tip. Fire up Regedit and click on down to the following keys:

My Computer \HKEY_CURRENT_USER\Control Panel\desktop
My Computer\HKEY_USER S\Default\Control Panel\desktop

In each one create the entry MenuShowDelay and then set its value to 200. All menus will now be much speedier

to click through, making navigating faster and giving the impression of a slick, easy-to-use operating system (which is what Windows 95 is trying hard to be. So helping it along is always a good cause).

Once your menus are zipping along, do the same for your keyboard. Fast key repeats give the impression that your system is slicker than it actually is. More importantly, it makes navigation with the cursor — and if you'd ever tried writing in Word or Notepad you'd notice it quite a lot — much faster. The difference

is quite remarkable, and it's as easy as clicking along to Settings, Control Panel, Keyboard and setting the repeat delay to the slowest value and repeat rate to the highest.

Optional additions

Most installs of Windows 95 will not set up all the features of the operating system. You can easily add features that you would like Windows 95 to have and remove unwanted options by opening the Windows Setup in the Add/Remove programs applet from the Control Panel. Here you will find parts of the Windows 95 setup with checkboxes indicating what has been installed and what hasn't. Go through each option, checking items to install and items that you definitely want removed, such as the Microsoft Network, which would inevitably have been installed without your permission. One of the most useful items in the Windows Setup is the Accessibility Options. Though this assistance is aimed towards handicapped users, many people find settings

such as ToggleKeys, which makes sounds when Caps Lock is enabled and disabled, very handy.

In case it isn't already apparent, two highly recommended additions to your system are a virus scanner and file archive tool. There are numerous virus scanners to choose from, some trial versions of which have been included on **apcmag.cd** in the past. Archiving, however, is a relatively standardised process, and WinZip is by far the most common archiving tool in use today. The latest version of WinZip can be found on **apcmag.cd**.

PowerToys, like WinZip, is another highly recommended addition. This little suite of utilities, written by the Windows 95 developer team, will allow you to toggle and change all those things that bug you about Windows 95. The latest version can be found at <http://www.tucow.com>.

The last recommended tool, and one which is rapidly becoming a necessity for Internet users everywhere, is ICQ. This program lets you set up a contact list with other ICQ users (such as your friends) allowing you to message, chat and send files on the spot, not to mention being able to see at a glance who is and isn't logged onto the Net. Once you start using it you'll wonder how you ever managed to do without it. The latest version for a number of platforms can be found at <http://www.mirabilis.com>.

Assuming your machine is all kilted-up following the suggestions in this article, then there's just one more task that every new Windows 95 installation should go through — a disk check and defragment. If you have the commercial Norton's Utilities available, you can use Disk Doctor and Speed Disk to check and optimise your disks respectively. If, however, you don't happen to have a copy readily available, you can use Windows 95's bundled ScanDisk and Disk Defragmenter to achieve the same task, though with less efficiency.

Last but not least . . .

When setting up Windows 95 for the first time, whether for yourself or for someone else, you have to christen the operating system.

The baptismal ritual should not take you too long; all that it involves is playing Minesweeper until you get the Best Time for the beginner level. Be warned, if Windows 95 is not christened properly it will be damned to an eternity of stuff-ups and crashes. If you cannot perform the christening ceremony yourself, get someone qualified to do it for you. ■



games such as Quake, then 100M will be required.

You'll find these settings under Control Panel, System, Performance, Virtual Memory. Also, if possible, place the swap file on a different physical drive than your Windows boot drive, as this will improve performance dramatically.

The adjustment of Windows 95's internal disk cache is along similar lines. In an attempt to optimise memory, Windows 95 will resize the disk cache on the fly. However, this can be detrimental to overall system performance if too little or too much memory is being reserved for the disk cache. For this reason it is a good idea to set a minimum and maximum size for the cache. For systems with 32M and above a good cache size is 8M; for systems with 16M or less, 4M is all that you would want to sacrifice. Edit SYSTEM.INI and add the following lines under the [VCACHE] entry (create it if it's not present):

```
MinFileCache=8192
MaxFileCache=8192
```


Interested in an alternative GUI? Why not try the X Window System made famous by Linux? By Ashton Mills

OS/2 Warp

It's a well-kept secret that XFree86 is available for OS/2. At first you might be mistaken for thinking XFree86 is the domain of all things Unix, but this just isn't the case. XFree86 has not only been ported to OS/2, it also runs like a dream.

XFree86/OS2

Why would you want to run XFree86 under OS/2? Because it gives you access to a wealth of Unix programs that aren't available as native OS/2 programs. Any former user of Unix can name at least 20 programs they miss, and half of them would be X games.

Of course, there's also the attractiveness of XFree86; if you haven't used it before, then you wouldn't know how good a GUI can look and how well it can perform. The design is light-years ahead of the Windows 95 or NT interface, and even ahead of the WPS.

If you've never tried or seen the trusty Linux GUI, I strongly suggest trying it out. If you're an old Unix user from your university days and you thought that OS/2 and its interface was the next best thing, I bet you're jumping up and down with glee at the prospect of merging the two.

Well, I certainly was.

Integration with OS/2

XFree86/OS2 runs full screen but *doesn't* replace your OS/2 desktop. Think of it as a full-screen Win-OS/2 session. You can swap between your OS/2 desktop and XFree86 just like any other full-screen application. This means that with XFree86 and the many ported programs, OS/2 is capable of running DOS, Windows 3.x, Win32s, OS/2, and now X Window programs — all at the same time. Quite an impressive feat for an operating system.

Before you get too excited, remember that it's a port. That is, the original XFree86 code is modified slightly to compile and run under OS/2. Thanks to EMX, this isn't a particularly troublesome thing, although it's involved a lot of work from XFree86/OS2's maintainer, Holger Veit. He's the person you can thank for porting

XFree86 to OS/2, and I strongly suggest you do. He's done an excellent job of porting it to run smoothly and reliably. In the process he also wrote the all-important driver — XF86SUP.SYS — that performs a number of functions, the most important of which are direct access to your system resources (such as video memory) and fast access to your I/O ports. Without this driver you cannot run XFree86/OS2. Check out the home page at <http://set.gmd.de/~veit/os2/xf86os2.html>.

Binaries and source

There are two ways of installing XFree86/OS2: the hard way, and the easy way.

The hard way is basically the normal Linux way — compiling it yourself. While this often means speed advantages under Linux, because the GUI is compiled specifically for your system, the advantages are not as great under OS/2. More to the point, OS/2 isn't set up to just download and

puters and associated technology, prefer to get on and do things rather than subject themselves to mental torture. I'm assuming you fit into this category.

The easy way involves just downloading the binaries and following the installation instructions, some aspects of which I'll be covering here along with some tips for configuration.

It goes without saying that it would be incredibly handy if you could grab the entire XFree86/OS2 binary distribution from our CD. Well guess what? XFree86/OS2 3.3.2, the latest version at the time of writing, is sitting there in its laser pocketed glory just waiting for you to install it. Now you know why APC is your favourite magazine.

Installation

The README.OS2 file is your very comprehensive guide to XFree86/OS2 and, more importantly, lists hardware and software requirements. Generally, XFree86/OS2 works fine on Merlin and earlier Warps with sufficient FixPacks, and although the video support is limited to those chipsets which have had input from generous programmers, rest assured the more popular cards (and even less popular ones) have support in XFree86/OS2. To be sure your video card is supported, read the README file. A comprehensive group of chipsets is listed near the beginning.

The next step is to follow the installation instructions in README.OS2, which I'll summarise here (otherwise known as Ashton's quick install routine). First copy the following zip files to an empty directory on your hard drive: X332base, X332doc, X332bin, X332fnts. If you want to take advantage of higher resolution fonts and installed documentation, copy the following across: X332man, X332f100, X332fsc1, X332fcyr, X332fsrv.

Next you'll need to copy across the exact X server for your video card. Hope-



compile programs on the fly, as Linux is. Unless you seriously know what you're doing, understand the tools you need and how to use them, and don't mind banging your head against the wall on a regular basis, then feel free to compile it yourself. It'll be a rewarding experience if you can do it. And at least you have the option to do so.

The easy way is for normal people who, while having a passionate interest in com-

fully, you've been through the list of supported chipsets in the README file and you know what your video card is. Given that you're an OS/2 user, I'm assuming you know which card you rely on for your fast desktop graphics. To save space here you'll find a list of video card models and the associated X332* zip file for your video card in the README.OS2 file. If there is no unique server for your card, copy across X332SVGA, the standard SVGA server, which supports just about any card that doesn't have its own server. While this will allow you to run XFree86/OS2, it won't necessarily be the fastest server.

Now for the install. Switch to the drive where you want to install XFree86/OS2. Take note this must be an HPFS drive in order to support long filenames. Also ensure you've got enough space; leaving 50M or more is a wise idea. Unzip *from the root of your drive* as follows:

```
unzip [path to XFree86/OS2 archive dir]/*.zip
```

Take note that you *need* to use an OS/2 native zip such as InfoZip's OS/2 Unzip; using a DOS or Windows zip will not work. As an avid OS/2 user, you should already have this on your system, but if not, it can be found at <http://hobbes.nmsu.edu>.

If you don't already have EMX installed, now's the time to install it. Simply unzip EMXRT onto your drive of choice and add [drive]\emx\dll to your LIBPATH in your CONFIG.SYS. While you're editing your CONFIG.SYS, add the following:

```
DEVICE=[drive]\XFree86\lib\xf86sup.sys
```

Then, below it, add the following environment variables:

```
SET TERM=ansi
SET TERMCAP=[XFree86/OS2drive]\XFree86\lib\x11/etc/emx.termcap.x11
SET ETC=[OS/2 drive path]\TCPIP\ETC
SET TMP=[OS/2 drive path]\TCPIP\TMP
SET HOSTNAME=[your chosen hostname]
SET USER=[your chosen username]
SET LOGNAME=[same as user]
SET HOME=[path]
SET X11ROOT=[drive where XFree86/OS2 is located]
SET DISPLAY=[hostname]:0.0
SET XSERVER=[XFree86/OS2 drive]\XFree86\bin\[chosen server]
```

Note that paths for TERMCAP, X11ROOT and XSERVER use Unix paths, with '/' instead of '\'. Also note that HOME can be any directory you choose, so you might as well make a directory called 'xhome' or with

the same name as your username, à la Unix, and point HOME to this directory.

Next, add the following to your PATH:

```
[Drive]\XFree86\bin
```

and then the following to your LIBPATH:

```
[Drive]\XFree86\lib
```

After all this is done, reboot.

Enter your \XFree86\bin directory and run XF86CONFIG. This allows you to set up XFree86/OS2 for your video card, among other things. Basically, just read everything onscreen and follow the instructions precisely. Be sure you know the capabilities of both your video card and monitor before you run the program, specifically your video card's chipset and how much RAM it has, and the maximum refresh rates and resolutions for your monitor. If you're unsure of your monitor's capabilities, look them up in your monitor manual. If you can't find this information you'll have to select a basic monitor configuration, which will provide low resolution and very low refresh rates — not a pretty thing.

When it comes to choosing video card support, say 'yes' to viewing the video card database and choose your card from the list.

Despite XF86CONFIG being a handy little program, it does have its faults. After you've written your configuration file, change to your \XFree86\lib\x11 directory and edit your XCONFIG file. Scroll down until you see a section about the mouse and uncomment the lines referring to 'Emulate3buttons'. This allows you to use the first and second buttons to emulate a third mouse button when pressed simultaneously, a rather useful feature in XFree86.

Next, scroll right down to the bottom where your video card and resolutions are defined. In its default state XFree86 will start in the lowest resolution and colour depth. You can use the hotkey combination of Ctrl, Alt and either + or - to increase or decrease this; but wouldn't it be better to just default to your chosen resolution and colour depth? Look at your settings and delete all the resolutions and colour depths you don't need. If you want to keep more than one resolution or depth, place it first in the list. You should end up with something like this:

Section "Screen"

```
Driver      "svga"
Device      "Matrox Millennium (MGA)"
Monitor     "Sony 17"
```

Subsection "Display"

```
Depth      16
Modes       "1024x768" "800x600"
ViewPort    0 0
Depth      8
Modes       "1024x768" "800x600"
ViewPort    0 0
```

EndSubsection

EndSection

Remove all duplicate sections and remove all subsections until you have just one section and one subsection, as in the above example. The only text under the 'Screen Sections' heading should be something similar to this example.

If, later, you're having trouble starting the server, run XF86CONFIG again and try putting your desired resolutions first using XF86CONFIG during the resolution configuration stage, and don't modify the file afterwards.

Save the file, run STARTX.CMD, and you're away.

What's next?

Just like Linux you can configure which programs, and more importantly which window managers, you use by editing XINITRC.CMD in \XFree86\lib\x11. If you decide to run FVWM, for example, just edit XINITRC.CMD and replace 'twm' with 'fvwm'.

Of course, there's no point setting up this wonderful GUI unless you take advantage of it, so now that it's all set up you'll need to download the applications you wish to use with it (not including the handy tools already present in \XFree86\bin).

Surf to <http://set.gmd.de/~veit/os2/xf86ported.html> to find a list of ported applications. Take note that you can't just run any old X Window application; there still needs to be a specific XFree86/OS2 port. Essentially, the program is compiled to native OS/2, with the exception that XFree86 is where output is directed. This is why porting Unix programs, with the help of EMX, is relatively easy, because the program stays the same in terms of its design for the X Window System. As you'll see from the link above, there's plenty of XFree86/OS2 software available, with new programs being added all the time.

Finally, if you check out the XFree86/OS2 directory on [apcmag.cd](http://apcmag.com) you'll also find a file called X332BONUS.ZIP. This file contains complete documentation for XFree86/OS2 and all the tools and applications that come with it, in an easy-to-browse HTML format.■

Mac OS printing comes close to the plug-and-play ideal, but here are a selection of tips for making a better impression. **By Stephen Withers**

Mac OS

Setting up a Mac printer is usually straightforward, but what do you do if the driver doesn't support Australian envelope sizes, or if the colours don't look right?

Paper sizes

Being able to ensure that your printer driver defaults to an appropriate paper size is a real convenience. Most Apple drivers (including many StyleWriters, Color StyleWriters and LaserWriters) can be set to A4 by running the A4 Paper Defaults installer, which can be found on the Apple Software Updates CD-ROM. International versions of Mac OS 8.0 and 8.1 may also set the default size to A4.

Some third-party drivers (such as Hewlett-Packard's DeskWriter driver) have an extra button in the Page Setup dialog that sets the default paper size and other settings to the current values. John Rawnsley's Printer Defaults (free-ware, on this month's apcmag.cd; subsequent versions can be found in your preferred Info-Mac mirror site's prn directory) can be used to alter default settings in the Page Setup and Print dialogs for a wide range of printer (and printer-like) drivers.

Sometimes you need to create a custom paper size, such as DL envelope. This can often be done fairly easily by using ResEdit to modify one of the existing sizes such as US letter. Start by duplicating the driver and giving the copy an appropriate name — I generally use 'My

StyleWriter' or similar. The exact method can vary between printers, but these instructions work for the ImageWriter, Color StyleWriter Pro and StyleWriter drivers. Open the copy of the driver in ResEdit, double-click on the PREC icon, then open PREC 3.

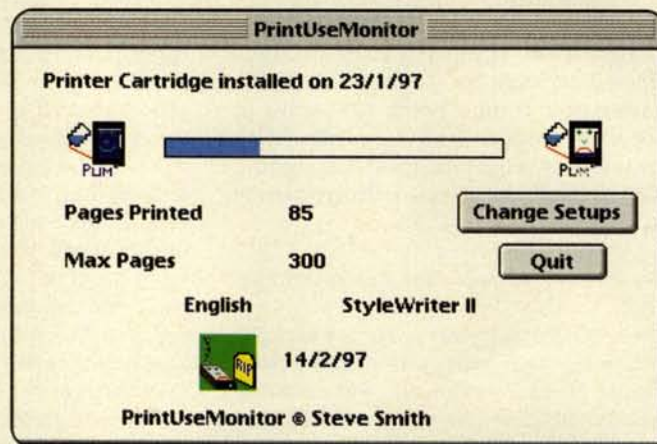
This resource lists the paper sizes and names that appear in the pop-up menu or radio buttons, and in each of these drivers, Btn 1 Name (scroll down if necessary to see it) is set to US Letter. Type 'DL Envelope' in its place. To change the dimensions, scroll back up so you can see Btn 1 Height and Btn 1 Width. These values are expressed in units of 120ths of an inch. A DL envelope measures 110mm high by 220mm wide, so type 520 (that is 110mm divided by 25.4 to convert to inches, then multiplied by 120 to get 120ths of an inch) into 'Btn 1 Height' and 1,039 (220*120/25.4) into 'Btn 1 Width'. The ImageWriter driver has a spare size at Btn 6, so you may be tempted to use that instead of Btn 1, but further modifications would be needed to make that button active.

Close the windows, save the changes, and select your modified driver in the Chooser. Create a new document in a suitable application, select Page Setup from the File menu, and pick your new paper size and test the results. You may need to adjust the document's margins to suit the printable area.

Recycled papers and envelopes aren't recommended for inkjet printers, but you may find the results acceptable if you avoid high-quality mode, as this deposits too much ink. Normal or draft settings are better, although they still fall short of the

standard required to make a good impression.

The well-known brands of office paper (and envelopes made from a decent bond paper) seem to do a good job for most purposes in laser or inkjet printers, but if



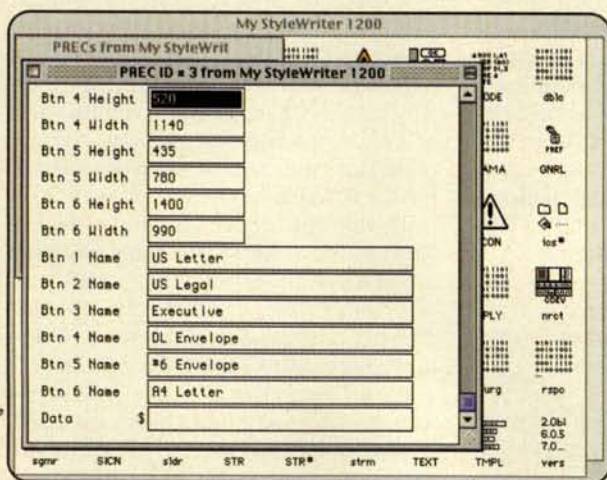
you're using the latter it's worth keeping a pack of good-quality inkjet paper on hand for special jobs such as presentation materials and important correspondence. The extra whiteness and better surface do make a noticeable difference.

On the subject of stationery, the range of inkjet-compatible products is quite extensive. A good supplier should be able to offer you a choice of papers, overhead transparency film, clear and opaque labels in a variety of sizes (including disk and videocassette labels), certificate and business card blanks, and even 'designer' papers and envelopes in a variety of colours and patterns. In addition, there are the glossy papers and thin cards intended for printing digital or digitised photos.

Fonts

Although I looked at font management in some detail in April (see APC April, page 138), there are a few issues that should be addressed here.

The usual advice to use TrueType fonts with QuickDraw printers and PostScript fonts with PostScript printers breaks down when you use both types of printer. This isn't as unusual as you may think; many offices use laser printers for most



purposes, but keep an inkjet for producing the occasional colour document. If you stick with TrueType, everything should work well unless you send documents to a service bureau for output. In that case, you'd be well advised to use PostScript fonts and install Adobe Type Manager (ATM, which is included with Mac OS 8.1 and some Adobe packages) on your Mac to generate smoothly-rendered fonts on the screen and any Quick-Draw printers.

Your choice may be coloured by the fact that you need ATM in order to read Acrobat documents, and by the type of font that predominates in your existing collection. If you are using ATM and find a particular font is producing jagged-looking type on the printed page, the most likely reason is that the screen font is present on the Mac, but the corresponding PostScript font is missing.

Some laser printers can be fitted with a hard disk that can store fonts in addition to those normally resident. This feature can reduce the amount of data sent to the printer for a particular job, cutting both the time taken and the total load on the network, and hard disks are no longer as expensive as they used to be. Fonts can be downloaded to the printer with the Apple Printer Utility, but this program is not part of a Mac OS 8.1 easy install — do a custom install if you need it. The utility will also download fonts into the printer's memory, but they only last until you switch the printer off. In a busy office, it can be worth the effort of downloading the most frequently used non-resident fonts each morning, but don't go overboard or you'll eat into your printer's limited RAM.

Share it around

The ability to share a low-end printer is a bonus for small home and office networks. Most of Apple's personal printers can be made available to other users, but once you get beyond two or three nodes it is usually more convenient to use networked printers. Some reasonably cheap inkjets can be fitted with network interfaces, which can be convenient.

Printer sharing is straightforward, assuming the network is already set up. Make sure the printer driver and the Printer Share extension are installed on all the computers. On the Mac which hosts the printer, select the appropriate driver in the Chooser and click the Setup button. In the resulting dialog box, select Share this Printer, enter an appropriate name (and

password if required), then click OK and close the Chooser.

Watch out for missing fonts: the host Mac should be equipped with each of the fonts installed on the client systems.

Running out

If you use your inkjet printer infrequently, running out of ink always seems to come as a surprise. If you do a lot of printing, you can simply keep a set of cartridges (or a refill kit, but that's another story) at hand. However, when I did that, the cartridges' 'use-by' dates kept passing before I'd had to install them.

If your printer uses translucent cartridges, probably the best answer is to flip open the printer every few weeks and inspect the ink levels. Look especially carefully at the black cartridge, as it may develop a 'tide mark' that masks the true level.

Most cartridges, however, are opaque. A solution is to use whatever logging facility is provided by the printer driver, along with a program to analyse the log. For example, Apple's recent StyleWriter and Color StyleWriter drivers keep a log of pages printed. To turn on this feature, click on the Setup button after selecting the printer in the Chooser, and check the Keep Log of Printer Usage box.

The resulting log file can be analysed with a program such as PrintUseMonitor (shareware, on this month's **apcmag.cd**; subsequent versions can be found in your preferred Info-Mac mirror's `prn` directory). PrintUseMonitor shows a simple bar graph indicating the approximate amount of ink used, along with a prediction of the date — based on your average use — when the cartridge may empty. The

program also works with the LaserWriter 300, as that driver can also record a usage log.

ColorSync

If your printer and monitor are supported by ColorSync, you'll find that using this piece of software makes a big difference to the production of colour documents. Without ColorSync, what you see is not what you get, at least in terms of colours. I recently produced a couple of jobs on a non-ColorSync inkjet printer, and yellows came out with a green tinge and what appeared bright red on the screen was printed in brown. The same documents were printed much more accurately by a Color StyleWriter Pro with the aid of ColorSync.

ColorSync uses a system of device profiles which describe the way particular monitors and printers generate colour. This allows the software to modify the colour information sent to the printer so the finished page closely resembles the screen image.

Assuming ColorSync 2.1 is installed, open the ColorSync System Profile, click the Set Profile button, and then pick the appropriate profile for your display. The recently-released ColorSync 2.5 moves this setting to the Monitors & Sound control panel.

There is still the problem of gamut, or the range of colours a particular device can print or display. Monitors have wider gamuts than printers, so there's always the possibility of using a colour that can't be printed accurately. ColorSync maps an out-of-gamut shade to the closest colour available on the destination device. ■

Updating the script

In *APC* October 1997 (see page 143), I presented my 'Mock OS 8' project to provide users of incompatible hardware with a similar look and feel to the latest system software.

This included an AppleScript to simulate Mac OS 8's Mail desktop icon. It worked, but it was rather clunky in that it required the user to locate the email program each time. Version 1.1.3 of ICScriptor fixes a bug that previously prevented scripts from obtaining the file creator code of the Internet application which handles the specified protocol. Armed

with that code, I've written a script telling the Finder to open the application without user intervention. The revised script is:

```
set theICAppSpec to GetICHelper "mailto"
set theAppCreator to fileCreator of the-
ICAppSpec
tell application "Finder" to open applica-
tion file id theAppCreator
```

As before, replace 'mailto' with 'http' for an equivalent script to launch your Web browser. The two scripts, complete with custom icons, are on **apcmag.cd**.

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Linux

The X Window System (or just 'X' for short) is the standard graphical user interface for Linux. This article describes how to configure some of the many aspects of X.

First, a bit of terminology. X is a client/server protocol which allows you (if you have a network) to run an application on one computer, and have it displayed on another computer. The X server is the program that runs on the display side of the connection, and the X clients are the actual programs that you run (for example, Netscape Navigator).

An X server is similar in purpose to a video driver under Windows; it draws text and graphics on your screen in response to requests from other programs. The most common X server is XFree86, which is shipped with practically every Linux distribution. Two other common X servers are Metro-X and Accelerated-X, both of which are commercial products. Regardless of which X server you use, your interface with the X Window System will be identical. The only difference between different servers may be their speed, their support for particular video cards, or their reliability; the actual graphics displayed, and your interface to Linux, are completely controlled by the X clients you run.

The rest of this article assumes that you already have a working X configuration, and will explain how to customise the behaviour of X.

xdm

The usual way of starting X is by logging in at the normal text log-in prompt and typing `startx`, but it is also possible to set Linux up so that X will always be running, and you will be presented with a graphical log-in prompt. The program responsible for this is `xdm`, the X Display Manager.

As mentioned last month, run level 5 is the standard X11 run level. When in this run level, the `init` process will start `xdm`. To test the operation of `xdm`, you can tell `init` to switch to run level 5 by typing `telinit 5`. If you want this to be the default behaviour when you boot Linux, change the `initdefault` line in the `/etc/inittab` file to read: `id:5:initdefault:`

XBanner

The default `xdm` log-in screen is a rather drab grey screen. To spice it up, Amit Margalit wrote a program called `XBanner`, with the sole purpose of making the `xdm` log-in screen beautiful. `XBanner` may already be included with your Linux distribution, but



if it isn't, then it is available on this month's **apcmag.cd**. The home page for `XBanner` is <http://physics.fullerton.edu/XBanner>.

Although `XBanner` is licensed under the GNU Public License, the author considers the software 'postcardware', so if you use it and like it you are requested to encourage him by sending him a postcard.

Installing `XBanner` from the source is quite straightforward, and there is a file called 'QuickStart' included with it which is a step-by-step guide to getting `XBanner` installed easily.

Customising the look of `XBanner` is performed by editing the file `/usr/X11R6/lib/X11/app-defaults/XBanner`, which contains plenty of comments describing each option. There are also a number of demo and example files to play with.

Window managers

A window manager is a specialised X client that controls the layout of windows on your screen, the drawing of window borders, and interactions with windows such as moving, resizing, and icon management. Since the window manager is separate from the X server, the look and feel of your desktop can be completely changed to suit you.

Linux, X configuration and window managers. **By Geoffrey Bennett**

There are a large number of window managers available, some of the more well-known being `FVWM2`, `Enlightenment`, `KDE` and `Gnome`. Information on many window managers as well as screenshots and sample configurations are available at <http://www.plig.org/xwinman>.

`FVWM2` (<http://www.hpc.uh.edu/fvwm>) is one of the most popular window managers, and is often the default window manager for a new Linux installation. `FVWM2` is designed to be lightweight, but it still has plenty of features and is quite customisable.

`Enlightenment` (<http://www.rasterman.com> and <http://www.enlightenment.org>) is a window manager currently under heavy development. It is not yet ready for general use as it is still in the alpha stages of development, but it is mostly usable, and it looks good. The guiding philosophy behind `Enlightenment` is that it is a window manager that is completely configurable in its appearance and functionality while still making efficient use of resources. `Enlightenment`'s primary author is Carsten Haitzler ('The Rasterman') from Sydney; `Rasterman` is now working at Red Hat Software in the Red Hat Advanced Development Laboratories (<http://www.labs.redhat.com>).

The `K Desktop Environment` (<http://www.kde.org>) is a full desktop environment which also includes a window manager (`kwm`) among other tools and applications. `KDE` is designed mainly for people new to Unix, and it is succeeding quite well in its aims, but it is unfortunately written using the commercial `Qt` library. This causes problems for distributions such as Red Hat Linux and Debian GNU/Linux, which prefer to rely entirely on free software.

`Gnome`, the Gnu Network Object Model Environment (<http://www.gnome.org>), is another desktop environment under development. `Gnome`'s aims are similar to `KDE`'s, but it is being written using only free software. Both Red Hat and Debian are committed to and contributing to the `Gnome` project.

Customising X startup

When you start an X session by running `startx`, a script called `xinitrc` will be run. At



the very least, this script will load a window manager, but it can also do anything else that you may want done whenever you load X, such as starting Netscape Navigator, loading a few xterms, or setting the colour of your desktop.

The xinitrc script should be able to be found in either the directory /etc/X11/xinit or /usr/X11R6/lib/X11/xinit, but rather than modifying the system-wide xinitrc script, it is a good idea to create your own version of xinitrc in your home directory. This way, if there is a problem in your own script, you can just rename or remove it, and you will get back the default X start-up behaviour. The script you create in your home directory must have the name .xinitrc (note the leading '.'), and the very first line should contain just #!/bin/sh so that it will be recognised as a script. Every other line in the file can be any command that you could normally run.

If you start X using xdm, you will need to create a file called .xsession instead of .xinitrc, but the contents of the file will be the same.

Here is an example .xinitrc file that will start up Navigator, an xterm, and the FVWM2 window manager:

```
#!/bin/sh
netscape &
xterm &
fvwm2
```

The use of the ampersand at the end of the netscape and xterm lines tells the shell script interpreter to run the command and place it into the background so that it can immediately continue to process further commands. If the ampersand were left off, the shell would wait for you to quit Navigator before running xterm, and then it would wait for you to quit the xterm before starting your window manager.

The finishing of the xinitrc script signals to X that your session has finished and that

it should quit. Since you will want your window manager to run for the entire X session, the best thing to do is to background all the processes that you want started, except for the window manager, which should be placed last. It is quite important that you don't background the window manager because that would cause the xinitrc script to finish immediately, and X will then shut down without giving you an opportunity to actually do anything.

Other common commands used in an .xinitrc file are:

- xclock displays an analog/digital

clock.

- xsetroot sets the appearance of your desktop (known as the 'root window' in X terminology).

- xv displays a picture on your desktop.

One particular switch which is worth knowing about, and is common to nearly every X application, is the -geometry switch. This allows you to specify the size and position of an application's initial window.

Sizes are specified as width by height, for example 50x50. Positions are also specified in pixels as +x+y.

Positions are normally measured from the top left-hand corner of your screen, but you can measure from the right or the bottom by using - instead of + before the x or y value, respectively. A few examples should make this clear:

- xclock -geometry 50x50 — a 50-pixel by 50-pixel clock with an unspecified position.
- xclock -geometry +0+50 — a clock placed on the left border of the screen, 50 pixels from the top.
- xclock -geometry 100x100-0+0 — a 100x100 clock, placed in the top right-hand corner of the screen.

The most common way to use xsetroot is with the -solid switch, to specify a particular solid colour to be displayed as your background. For example: xsetroot -solid RosyBrown

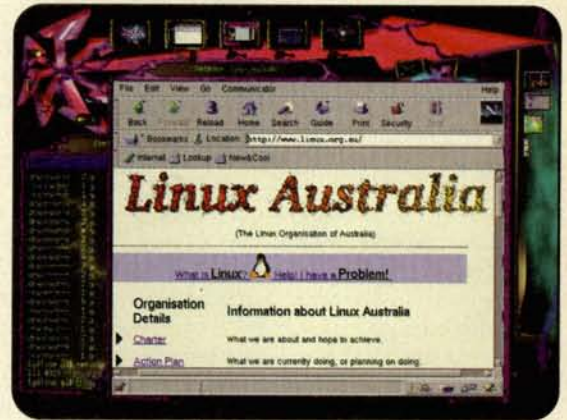
A full list of colours is available in the file /usr/X11R6/lib/X11/rgb.txt. It is also possible to specify colours in the same way that you would in an HTML document, for example, using xsetroot -solid "#000060" to obtain a dark blue.

The xv utility is a general image display utility, and one of the many things it

can do is load a picture into your root window. To do this, you could use: xv -root -quit picture.jpg.

This would tile picture.jpg across your root window (the -quit tells xv to quit after placing the picture there, because the picture will stay there by itself). If you wanted the picture to be scaled up to fit the screen without distorting the aspect ratio, you could use the -maxspect option, or if you just wanted it to fill the screen, there is the -max option.

For further information about xclock or xsetroot, the man pages describe other options that are available. For further information about xv, there is documentation in PostScript form available which is probably stored in a directory such as /usr/doc/xv-*, and should be viewable with ghostview



xvdocs.ps or gv xvdocs.ps, providing you have ghostscript/ghostview installed.

Note that if your window manager configuration setting also sets your root window colour, then you will probably see the colour you set or the image you load only appear for a brief time. In this case, you will probably want to change the window manager configuration so that it leaves the root window alone.

Window manager configuration

Configuration of a window manager is very dependent on the particular window manager in use, and the documentation for the window manager will describe how to configure it. As an example, to get started with customising FVWM2, copy the file /usr/X11R6/lib/X11/fvwm2/system.fvwm2rc to your home directory and call it '.fvwm2rc'. You can then edit this file to set up your environment. There are many comments throughout that file, but complete documentation on its format is available in the man page for FVWM2.■

The next instalment on the basics of Windows programming. **By Michael Smith**

Developers Corner

Last month we scratched the surface of Windows API programming and built that most vital of applications, HelloAPC. This month we're going to expand and enhance our new *killer app*.

HelloAPC displays the message 'Hello, APC Readers!'. However, it lacks one thing that all great programs have: options. You have to have something the user can change, whether it's needed or not.

Being resourceful

In the bad old days when 64K was a lot of RAM, users had to remember complex command-line arguments to make a program do what they wanted. These days, however, most of us have come to expect more interactive interfaces: menus, dialogs and push buttons.

The best way to define these niceties under Windows is using a *resource file*. A resource is simply data. It can be a definition for a menu, a cursor, a dialog or a control, or it can be a character string or even a bitmap or icon. With Microsoft Visual C/C++ 5.0, the resource file (name.rc) is compiled using the resource compiler, rc.exe, into name.res. The 'res' file is then linked, along with the object files, to produce the executable.

On today's menu

So let's add a menu to our HelloAPC app. We'll start with an option to change the greeting from 'Hello' to 'G'day' or 'Bonjour'. First we define some menu IDs in an include file.

```
#define IDM_HELLO    1
#define IDM_GDAY     2
#define IDM_BONJOUR  3
#define IDM_EXIT     4
#define IDM_ABOUT    10
```

The numeric values can be anything you like, but they must be unique. Next we create a resource file and define the menus:

```
#include <windows.h>
#include "menu.h"
```

```
AppMenu MENU {
    POPUP "&File" {
        MENUITEM "&Hello"    IDM_HELLO
        MENUITEM "&G'day"    IDM_GDAY
        MENUITEM "&Bonjour"  IDM_BONJOUR
        MENUITEM "E&xit"    IDM_EXIT
    }
    POPUP "&Help" {
        MENUITEM "&About HelloAPC"
        IDM_ABOUT
    }
}
```

Here we've defined a menu called AppMenu, with two submenus called 'File' and 'Help'. The File submenu has four items, and the Help submenu has one. The ampersand (&) character marks which letter will activate the menu or item when keyboard menu navigation is used.

We now change the `mt_register_class()` routine to register the menu. We replace

```
wndclass.lpszMenuName = NULL;
```

with

```
wndclass.lpszMenuName = "AppMenu";
```

The last step is to write some code to react when the user clicks on the menu. Clicking on a menu generates a `WM_COMMAND` message. We modify the `WndProc()` callback to process the menu commands.

```
LRESULT CALLBACK WndProc( HWND
hwnd, UINT iMsg, WPARAM wParam,
LPARAM lParam )
{
    switch (iMsg)
    {
        case WM_CREATE:
            return 0;
        case WM_PAINT :
            return paint_proc( hwnd, iMsg, wParam,
lParam );
        case WM_COMMAND:
            return menu_proc( hwnd, iMsg, wParam,
lParam );
        case WM_DESTROY:
```

```
PostQuitMessage( 0 );
return 0;
}

return DefWindowProc( hwnd, iMsg,
wParam, lParam );
}
```

When a `WM_COMMAND` message is received, it is passed to the `menu_proc()` function to be dealt with:

```
LRESULT menu_proc( HWND hwnd, UINT
iMsg, WPARAM wParam, LPARAM lParam )
{
    int iMenuId = LOWORD( wParam );
    switch (iMenuId) {
        case IDM_HELLO:
            set_greeting( "Hello" );
            InvalidateRect( hwnd, NULL, 1 );
            break;
        case IDM_GDAY:
            set_greeting( "G'day" );
            InvalidateRect( hwnd, NULL, 1 );
            break;
        case IDM_BONJOUR:
            set_greeting( "Bonjour" );
            InvalidateRect( hwnd, NULL, 1 );
            break;
        case IDM_EXIT:
            SendMessage( hwnd, WM_CLOSE, 0, 0 );
            break;
        case IDM_ABOUT:
            MessageBox( hwnd, "Demonstration Win-
dows Program", mt_get_appname(), MB_ICO
NINFORMATION | MB_OK );
            break;
    }
    return 0;
}
```

The `menu_proc()` function first determines which menu item was selected. The Hello, G'day and Bonjour menu items simply save the modified greeting for use by the `paint_proc()` function, then call `InvalidateRect()`, which causes the window to be repainted.

The Exit menu item sends a message to the main window asking it to close itself, and the About menu item pops up a standard Windows message box.

Dialogs

Now, in our search for software perfection, we add a dialog to our app so that the user can specify their own greeting. For this we must return to the resource file.

```
DlgGreeting DIALOG DISCARDABLE 49, 32,
192, 66
STYLE WS_POPUP | WS_CAPTION | WS_VISIBLE
BS_ALIGN | WS_3DLOOK | WS_MODAL
FRAME | WS_VISIBLE
CAPTION "Enter a Custom Greeting"
BEGIN
    DEFPUSHBUTTON "OK",
        IDD_GR_OK, 32, 42, 55, 12,
        WS_CHILD | WS_GROUP | WS_TAB-
        STOP | WS_VISIBLE | BS_DEFPUSHBUTTON
    PUSHBUTTON "Cancel",
        IDD_GR_CANCEL, 100, 42, 55, 12,
        WS_CHILD | WS_GROUP | WS_TAB-
        STOP | WS_VISIBLE | BS_PUSHBUTTON
    LTEXT "Greeting String",
        IDD_GR_TEXT, 15, 17, 52, 9,
        WS_CHILD | WS_VISIBLE
    CONTROL "Hello",
        IDD_GR_EDIT, "EDIT", WS_CHILD | WS_
        GROUP | WS_TABSTOP | BS_AUTOHSCROLL
        75, 16, 85, 11
END
```

Everybody should design a dialog by hand once, but never again after that. There are plenty of tools available to design a dialog graphically, and one look at the syntax will convince you of the benefit of such tools. This dialog, which we've called `DlgGreeting`, has four controls: two buttons, a text string and an edit control. We create a Dialog Procedure:

```
BOOL CALLBACK dlgGreetingProc( HWND
hDlg, UINT iMsg, WPARAM wParam,
LPARAM lParam )
{
    char szGreeting[SZ_GREETING];
    HWND hEdit, hwnd;
    switch (iMsg) {
        case WM_INITDIALOG:
            break;
        case WM_COMMAND:
            switch (LOWORD(wParam)) {
                case IDD_GR_OK:
                    hEdit = GetDlgItem(hDlg, IDD_GR_EDIT);
                    GetWindowText(hEdit, szGreeting,
SZ_GREETING);
                    set_greeting( szGreeting );
                    InvalidateRect( hwnd, NULL, 1 );
                    EndDialog( hDlg, FALSE );
                    break;
                case IDD_GR_CANCEL:
                    EndDialog( hDlg, FALSE );
                    break;
            }
    }
```

```
    }
    return 0;
}
```

When the OK button on the dialog is pressed, first the window handle for the edit control appears, then the text contents of that control. The new greeting is saved for use by the paint procedure, then `InvalidateRect()` is called to force a repaint of the main window. Finally the dialog is closed.

Off-colour

Our final modification is to allow the background to be changed. We specify the background in four different ways, but in each case we set the colour using the same method:

```
case IDM_BGWHITE:
    SetClassLong( hwnd, GCL_HBRBACK-
GROUND,
(long)GetStockObject(WHITE_BRUSH) );
    InvalidateRect( hwnd, NULL, 1 );
    break;
```

`SetClassLong()` simply sets a parameter in the window class. When we registered the main window class we included in the initialisation:

```
wndclass.hbrBackground = (HBRUSH)Get-
StockObject( WHITE_BRUSH );
```

`GetStockObject()` returns a predefined graphics object, in this case a brush. Using `SetClassLong()` we can reinitialise the window class brush:

```
#define COLOUR_YELLOW RGB(0xFF,
0xFF,0x00)
```

```
case IDM_BGYELLOW:
    rgbSaveCol = COLOUR_YELLOW;
    hBrush = CreateSolidBrush( rgbSaveCol );
    SetClassLong( hwnd, GCL_HBRBACK-
GROUND, (long)hBrush );
    DeleteObject( hBrush );
    InvalidateRect( hwnd, NULL, 1 );
    break;
```

Instead of using a stock brush, we could create our own. The colour is defined using an RGB triplet; `CreateSolidBrush()` is called to create the brush. Because this is not a stock brush, we need to delete it after we have used it.

```
case IDM_BGCUSTOM:
    rgbSaveCol = get_custom_colour( rgb-
```

```
SaveCol );
    hBrush = CreateSolidBrush( rgbSaveCol );
    SetClassLong( hwnd, GCL_HBRBACK-
GROUND, (long)hBrush );
    DeleteObject( hBrush );
    InvalidateRect( hwnd, NULL, 1 );
    break;
```

Another alternative is to allow the user to specify their own colours. The simplest way to do this is to use the `ChooseColor()` Windows function.

```
COLORREF WINAPI get_custom_colour(
COLORREF rgbInit )
{
    static CHOOSECOLOR cc;
    static COLORREF crCustColors[16];
    cc.lStructSize = sizeof(CHOOSECOLOR);
    cc.hwndOwner = NULL;
    cc.hInstance = NULL;
    cc.rgbResult = rgbInit;
    cc.lpCustColors = crCustColors;
    cc.Flags = CC_RGBINIT;
    cc.lCustData = 0L;
    cc.lpfnHook = NULL;
    cc.lpTemplateName = NULL;
    ChooseColor( &cc );
    return cc.rgbResult;
}
```

Our last method is to use a bitmap to create the brush:

```
case IDM_BGCHECKED:
    hBitmap = LoadBitmap( hInstance,
"CheckBMP" );
    hBrush = CreatePatternBrush( hBitmap );
    SetClassLong( hwnd, GCL_HBRBACK-
GROUND, (long)hBrush );
    DeleteObject( hBrush );
    DeleteObject( hBitmap );
    InvalidateRect( hwnd, NULL, 1 );
    break;
```

The bitmap is defined in the resource file: `CheckBMP` `BITMAP` `check.bmp`.

`CheckBMP` is the name we have assigned to the bitmap, and `CHECK.BMP` is the bitmap file.

The next step

Hand coding isn't the best approach for medium-to-large applications. Many tools now exist to automate much of the spadework of Windows programming, and most work pretty well. Still, you will most likely write better programs if you understand a little of what's going on under the hood.

All the source code for this article is available on **apcmag.cd**.

This month we look at some of JavaScript's built-in objects. By Travis Simon

JavaScript

This series of articles on JavaScript should be enough to provide you with a solid foundation for programming in JavaScript. However, reading articles alone will not make you a programmer. The only way to learn to program is to write programs.

The best way to learn JavaScript is to go through each article and write a program that uses each of the concepts presented. By writing many simple programs, you will sort out any errors *before* attempting to use several unfamiliar concepts at once. Another advantage of writing practice scripts is that you gain a more intimate understanding of the language. Once you understand a feature, it is immediately accessible when you need it in the future.

This month, we're going to delve into the meat of the language and begin a look at JavaScript's built-in objects. First, however, we will revisit the topic of version differences between browsers.

Understanding JavaScript versions

When JavaScript was first introduced, Webmasters were thrilled to have such a powerful tool at their disposal. However, the first release of the language was disappointingly inadequate, prompting Netscape to revisit the language and make improvements. For the most part, the second release of JavaScript was fairly complete. The third (and most recent) release of JavaScript took the foundation of the language, added a few nice touches, and added support for dynamic HTML.

While developers have welcomed these improvements, they have come at a price. As you might imagine, the newer features of the language do not work in older browsers. To further complicate the situation, Microsoft is always a version behind Netscape in JavaScript support. What this means to the developer is that there are at least four major browsers, each supporting different versions of JavaScript.

The following table lists the JavaScript version supported by each browser. I don't claim to have used every feature of the language in every browser on the market, so use the table only as a guide, and test

your scripts in all targeted browsers. This article will cover objects from the first (Version 1.0) and second (Version 1.1) releases of JavaScript. I have intentionally excluded Version 1.2 of JavaScript because, at the time of writing, only Navigator 4 supports it. Further, the most important aspect of Version 1.2 is the introduction of dynamic HTML. Unfortunately, Microsoft and Netscape have both implemented different (read, incompatible) versions of DHTML, and until the whole mess is sorted out, dynamic HTML is all but useless.

Browser	JavaScript Version
IE3	Version 1.0
Navigator 3	Version 1.1
IE4	Version 1.1
Navigator 4	Version 1.2

The <script> tag

There are, however, ways to tailor your script to accommodate different language versions and incompatible browsers. February's column included a script for detecting the browser used to execute the script (see APC February, page 122). You can also use the <script> tag to write scripts for Version 1.1 (or 1.2) compatible browsers only. To create version-specific code, include the version information in the language attribute. For example, to write a script that is interpreted only by Version 1.1-compliant browsers, you would use the following code:

```
<script language="JavaScript 1.1">
// Version 1.1 (and earlier) compliant code
</script>

<script language="JavaScript">
// Version 1.0 (only) code
</script>
```

Learning the objects

The following paragraphs give a high-level description of some of JavaScript's objects. Each object can potentially have several properties, methods, and event handlers associated with it. Space restrictions prevent in-depth coverage of each

object, but this month's CD examples include more detailed coverage of each object, as well as information on the properties, methods and event handlers of each object.

The Anchor object

The Anchor object is the JavaScript adaptation of HTML anchor objects. JavaScript makes the anchors on a page available through the anchors array (which is a property of the document object). The only property of the anchors array is the length property.

An anchor is created in HTML using the syntax. You can then create a link to a specific anchor on a page using the syntax .

I have yet to find any use for the Anchor array, and you need only share a casual acquaintance with the object.

The Array object

The Array object is used to create arrays in JavaScript. An array is a grouping of variables that share a common name and are differentiated by numeric or text indexes. You create an array in JavaScript with the 'new' keyword, followed by the array constructor. The array constructor accepts one argument — a numeric value specifying the number of array elements to initialise. JavaScript features dynamically growable arrays, so it isn't necessary to include this argument. For example, the following code creates an array, and initialises it with two values:

```
var myArray = new Array();
myArray[0] = "First element";
myArray[1] = "Second element";
```

JavaScript also features associative arrays, whereby you can index array elements with text strings. For example:

```
var employee = new Array();
employee["Ashton"] = "Workshop editor";
employee["Travis"] = "Developer";
```

If your text indexes to create an associative array, you cannot then revert back to numeric indexes to refer to array elements.

The Array object has only one property: `length`. However, Version 1.1 added the `join`, `reverse` and `sort` methods, which can be used to perform common array manipulation.

The Button object

The Button object is the JavaScript implementation of an HTML form button. The Button object is a property of the Form object, and can only be used inside opening and closing `<form>` tags. Button objects are used to trigger an event using the `onClick` event handler. Button object methods include the `click()`, `blur()` (Version 1.1) and `focus()` (Version 1.1) methods, as well as the associated event handlers (`onClick`, `onBlur` and `onFocus`).

The button object is closely related to the Submit and Reset objects, which create buttons for submitting and resetting forms. One of the most common uses for button objects is to label it 'Submit' or 'Reset', and call a function that performs some sort of validation before continuing with the event.

The HTML syntax for creating a button is:

```
<input
type = "button"
name = "Button Name"
value = "Button Text"
[onBlur = "onBlur instructions"]
[onClick = "onClick instructions"]
[onFocus = "onFocus instructions"] >
```

It's important not to confuse the name and value attributes of a button. The name attribute specifies the handle by which you can refer to the button within the code, whereas the value attribute specifies the text to appear on the button face.

The Checkbox object

Checkboxes can be added to HTML forms to allow users to select or deselect an item. A checkbox is similar in scope to a radio button, except that multiple selections are not mutually exclusive. Like other form objects, Checkbox objects must be included inside opening and closing `<form>` tags. The syntax for a checkbox object is:

```
<input
type = "checkbox"
name = "CheckboxName"
value = "ServerValue"
```

```
[onBlur = "onBlur instructions"]
[onClick = "onClick instructions"]
[onFocus = "onFocus instructions"]>
```

The name attribute of the checkbox object specifies the name you can use to refer to the object. The value attribute specifies the text that will be submitted back to the server when a form is submitted. Finally, Checkbox objects have the `blur()`, `click()` and `focus()` methods associated with them, as well as the associated event handlers.

The Date object

The Date object is used to create representations of a date and time with JavaScript. Date objects work by storing a date as a specific number of milliseconds since the first second of January 1, 1970 (thus, dates before 1970 are not allowed).

There are a number of different ways to create a date object. The first is with no arguments to the constructor:

```
var today = new Date();
```

This method of creating a date object initialises it with the current date and time. The second method accepts a string representation of a date in the following form:

```
var aDate = new Date("month day, year
00:00:00");
```

The month, day and year must be included in a single string. Optionally, you can include number representations of the minutes, seconds and milliseconds. If excluded, the date object will be initialised with the minutes and seconds set to zero. For example, you could set a date object to the 'millennium' with the following code:

```
var millennium = new Date("January 1,
2000");
```

The next method of creating a Date object uses integer (*not* string) arguments to create a date. The seconds information again is optional:

```
var date = new Date(year, month, day,
00:00:00);
```

For example, to set the date to Christmas 1990, you would use the following syntax:

```
var date = new Date(90, 12, 25);
```

The Date object has too many methods to list here. Most involve extracting or setting a specific portion of the date object, or converting from one representation of time to another.

The Document object

The Document object is the JavaScript representation of an HTML document. It encompasses everything that comprises a Web page, including the background colour, foreground colour, and links. The syntax for creating the body of a document in HTML is:

```
<body
background = "(background image URL)";
bgcolor = "(background colour)";
text = "(foreground or text colour)";
link = "(hypertext link colour)";
vlink = "(visited hypertext link colour)";
alink = "(active (or currently being clicked)
hypertext link colour)";
[onBlur = "onBlur instructions"];
[onFocus = "onFocus instructions"];
[onLoad = "onLoad instructions"];
[onUnload = "onUnload instructions"];>
</body>
```

All colours in the listing should be expressed as either hexadecimal RGB triplets (`#RRGGBB`), or by using a JavaScript string literal. For example, both of the following statements will set the background colour to white:

```
<body bgcolor="white">
<body bgcolor="#FFFFFF">
```

The `onBlur` and `onFocus` event handlers (as well as the `blur()` and `focus()` methods) were added in Version 1.1 of JavaScript, and are actually event handlers of the window object. They are included here because the event handlers are placed within the `<body>` tag.

The Date object has many object arrays as properties, including the anchors array, applets array (Version 1.1), embeds array (Version 1.1), forms array, images array (Version 1.1) and the links array. Document objects have many associated properties and methods relating to every aspect of a document, detailed in this month's CD examples.

Next month we will continue our look at JavaScript's built-in objects. Make sure that you look at the examples on **apcmag.cd** for more information on each of the objects presented here. ■

How to take advantage of database connectivity. **By Lee Borkman**

HyperText

Last month we used office software to generate static HTML pages from a database. This month we are going to look at some true Web-database connectivity.

For this our generic office software is not going to be adequate. We need to use specialised Web tools. We will also need some control over our Web server's configuration.

We've been talking about a hypothetical cinema that publishes its current movie schedule on the Web. Information is stored in a simple database (in this case, it's Microsoft Access, but any database will do). Our data is stored in a table (tblFilms), and might look something like this:

Table 1

FilmID	Title	Description	StartDate	EndDate
6	The World According to Garp	Man bites dog	15-Mar-98	15-Apr-98
7	Pulp Fiction	Uma Thurman has a nasty nosebleed	01-Apr-98	30-Apr-98
8	Duel	Man fights truck	15-Apr-98	15-May-98
9	Deconstructing Harry	Young women like Woody	01-May-98	31-May-98

Our 'current' film schedule will include all films that will be screened sometime in the next week. We can define a query that will list all such films. The query, a peculiar combination of SQL and Visual Basic, is called qryCurrent, and looks like this:

```
SELECT tblFilms.*, Format([StartDate],"dd mmm yyyy") AS StartString, Format([EndDate],"dd mmm yyyy") AS EndString
FROM tblFilms
WHERE (((tblFilms.StartDate)<=DateAdd("d",7,Now())) AND ((tblFilms.EndDate)>=Now()));
```

If that query is run on 20/4/98, it produces the results in Table 2. The challenge now is to hook this database up to the Web so we don't need to go through the process of manual regeneration and publishing.

The first step is to set up an ODBC driver that will allow our Web server to 'see' the database. If your Web server and database are running in a Windows environment on a common network, then this is very simple

(if not, then you will need some network wizardry, which is a little beyond the scope of this piece). Just open up the ODBC preferences in the Windows Control Panel, go to the System DSN, and choose Add to create a new Data Source definition. Choose the appropriate database driver, name the data

the Title field in each data row. Where does the data come from? FrontPage uses an IDC file to define the database connection. Use the FrontPage Editor to create a new Database Connection page. This brings up a wizard in which you give the name of the data source ('Cinema'), and define the SQL query

Table 2

FilmID	Title	Description	StartDate	EndDate	StartStrin	EndString
7	Pulp Fiction	Uma Thurman has a nasty nosebleed	01-Apr-98	30-Apr-98	01 Apr 1998	30 Apr 1998
8	Duel	Man fights truck	5-Apr-98	15-May-98	15 Apr 1998	15 May 1998

source 'Cinema', and select the location of the database file. Your system will be able to communicate with your database by referring to its name, Cinema.

Every software company has its own solution for Web-connecting databases. I'm going to look at two popular packages, Microsoft's

that will return the data. In this case, the query is simple:

```
SELECT * FROM qryCurrent
```

The IDC wizard will also ask for the name and location of the template file that will be used to format the results. We will choose CURRENT.HTX, which we have just created. All that is left is to save CURRENT.IDC in a new directory on our Web server document tree, and to edit the directories properties to allow the execution of scripts. If we now point our browser at the IDC file (for example, <http://local>

FrontPage and Allaire's Cold Fusion. Most of the techniques are transferable to other systems.

The first big leap in database connectivity will be providing real-time *read-only* access to our data. FrontPage performs this task using IDC and HTX files. Note that this requires Microsoft's FrontPage Server Extensions to be installed on your Web server. These extensions are available for most popular servers (yes, including Netscape) and most platforms.

Using the FrontPage Editor we create a new Database Results template called CURRENT.HTX (see right).

You will see that the source includes some strange tags using '%'. The text within the <%begin-detail%> tags will be included for every row of data from the database. <%Title%>, for example, will be replaced by the value of

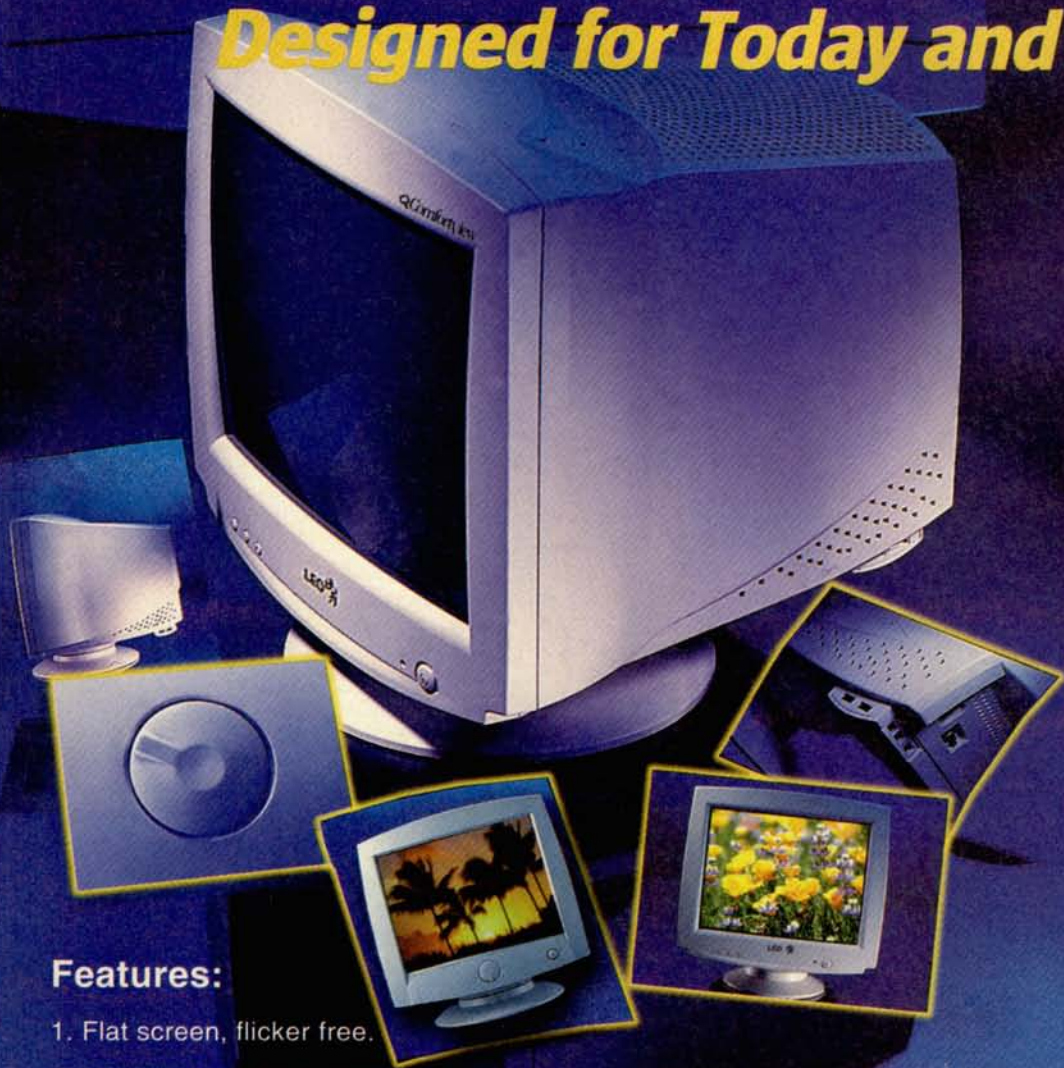
CURRENT.HTX

```
<html>
<head><title>Current Movies</title></head>
<body bgcolor="#FFFFFF">
<p align="left"><font face="Arial"> <strong>This
week's movies are:</strong></font></p>
<table border="1" cellpadding="5" cellspacing="1"><tr>
<td><font color="#008000" face="Arial"><strong>
Title</strong></font></td>
<td><font color="#008000" face="Arial"><strong>
Description</strong></font></td>
<td><font color="#008000" face="Arial"><strong>
Start Date</strong></font></td>
<td><font color="#008000" face="Arial"><strong>
End Date</strong></font></td></tr>
<%begin-detail%><tr>
<td><font face="Arial"><strong><%Title%></st
rong></font></td>
<td><font face="Arial"><%Description%></font></td>
<td><font face="Arial"><%StartString%></font></td>
<td><font face="Arial"><%EndString%></font>
</td>
</tr><%end-detail%></table>
</body>
</html>
```


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CURRENT.CFM

```
<CFQUERY NAME="GetCurrent" DATASOURCE="Cinema">
  SELECT * FROM qryCurrent
</CFQUERY>
<HTML>
<HEAD><TITLE>Current Movies</TITLE></HEAD>
<BODY BGCOLOR="#FFFFFF">
<P ALIGN="left"><FONT FACE="Arial"> <B>This week's
movies are:</B></FONT></P>
<TABLE BORDER="1" CELLPADDING="5" CELL SPACING
="1"><TR>
  <TD><FONT COLOR=#008000 FACE="Arial">
<B>Title</B></FONT></TD>
  <TD><FONT COLOR=#008000 FACE="Arial">
<B>Description</B></FONT></TD>
  <TD><FONT COLOR=#008000 FACE="Arial"> <B>Start
Date</B></FONT></TD>
  <TD><FONT COLOR=#008000 FACE="Arial"> <B>End
Date</B></FONT></TD></TR>
<CFOUTPUT QUERY="GetCurrent"><TR>
  <TD><FONT FACE=ARIAL><B>#Title#</B></FONT>
</TD>
  <TD><FONT FACE=ARIAL>#Description# </FONT></TD>
  <TD><FONT FACE=ARIAL>#StartString# </FONT></TD>
  <TD><FONT FACE=ARIAL>#EndString# </FONT></TD>
</TR>
</CFOUTPUT></TABLE>
</BODY>
</HTML>
```

host/cinema/scripts/current.idc), our server should return a nicely formatted Web page.

The next step in database connectivity is real-time, *read-and-write* access. For this, FrontPage's IDC/HTX system will not be enough. We need to step up to something like Microsoft Active Server Pages (ASPs), or Netscape's LiveWire. Although any these systems have similar capabilities, I'm going to use Cold Fusion, a simple, elegant (and inexpensive) package from Allaire.

The Cold Fusion package consists of two parts. The first is the Cold Fusion Application Server, which piggybacks on your existing Web server. The second part is the Cold Fusion Studio, an enhanced version of HomeSite that includes real-time access to the structure and content of your data sources.

Check out CURRENT.CFM (above), the Cold Fusion page which displays the week's films.

This source looks a lot like the CURRENT.HTX file. The major difference is that Cold Fusion rolls the HTX and IDC pages into one file. The data source and SQL query are defined at the top of the page in the <CFQUERY> tags. Further down, the <CFOUTPUT> tags take the place of FrontPage's <%detail%> section.

When your browser is pointed at this page (<http://localhost/cfdocs/cinema/current.cfm>), we get the same result as we did

from our FrontPage IDC file. But that's not all Cold Fusion can do for us. We can also update, edit, and insert data into our database via a Web page. Take a look at the box on the right.

This file, FILMS.CFN, lists all films in the tblFilms table, and also provides a form for adding new film data. This page uses some powerful constructs, including conditional execution, and an SQL INSERT query. At the very top of the page is a <CFIF> </CFIF> section. Ignore that for now. Look further down and you will see the CFQUERY, GetFilms. This grabs all of the data from the tblFilms table in our Cinema database. The CFOUTPUT section later outputs that data in an HTML table. That's pretty easy, but look down even further. There's a standard HTML form that begins like this:

```
<FORM ACTION="Films.cfm?EnterNewFilm=Yes" METHOD=POST>
```

The form calls this very file, FILMS.CFM, and adds a parameter, EnterNewFilm, with its value set to Yes. At this point, we go right back to the top of the page and look at the CFIF section. As you will have figured out, CFIF is the Cold Fusion If tag. In this example, the contents of the CFIF section are only executed if the parameter EnterNewFilm exists, and is set to Yes. And when does that happen? When new film data is entered in the form at the bottom of the page, and the 'Submit new film' button is pressed.

So what's inside the CFIF tags? It's a query that inserts data into our database's tblFilms table. The data that gets inserted is #Title#, #Description#, and so on, which are the values of the form fields. The data is inserted, and only then is the next query, GetFilms, executed. This means that our HTML table will include the newly inserted data. Very cool.

So, there's a brief introduction to Web-database connectivity. As you can see, it's quite an involved topic, but don't be put off. The increase in power that comes about by connecting your Web site to a

FILMS.CFN

```
<CFIF #ParameterExists(EnterNewFilm)# IS "Yes">
<CFQUERY NAME="EnterNewFilm" DATASOURCE="Cinema">
  INSERT INTO tblFilms
    (Title, Description, StartDate, EndDate)
  VALUES ('#Title#', '#Description#', '#StartDate#',
'#EndDate#')
</CFQUERY></CFIF>
<CFQUERY NAME="GetFilms" DATASOURCE="Cinema">
  SELECT * FROM tblFilms
</CFQUERY>
<HTML>
<HEAD><TITLE>All Movies</TITLE></HEAD>
<BODY BGCOLOR="#FFFFFF">
<TABLE BORDER="1" CELLPADDING="5" CELL SPACING="1"><TR>
  <TD><FONT COLOR=#008000 FACE="Arial">
<B>Title</B></FONT></TD>
  <TD><FONT COLOR=#008000 FACE="Arial">
<B>Description</B></FONT></TD>
  <TD><FONT COLOR=#008000 FACE="Arial"> <B>Start
Date</B></FONT></TD>
  <TD><FONT COLOR=#008000 FACE="Arial"> <B>End
Date</B></FONT></TD></TR>
<CFOUTPUT QUERY="GetFilms"><TR>
  <TD><FONT FACE=ARIAL><B>#Title#</B></FONT></TD>
  <TD><FONT FACE=ARIAL>#Description# </FONT></TD>
  <TD><FONT FACE=ARIAL>#StartDate# </FONT></TD>
  <TD><FONT FACE=ARIAL>#EndDate# </FONT></TD></TR>
</CFOUTPUT>
</TABLE>
<P><BR><B><FONT FACE="Arial" SIZE="1"
COLOR=#008000">Enter New Film:</FONT></B>
<FORM ACTION="Films.cfm?EnterNewFilm=Yes" METHOD=
POST>
<TABLE>
<TR><TD VALIGN=TOP><FONT FACE="Arial">Title </TD>
<TD><INPUT TYPE="text" NAME="Title" SIZE=46></TD>
</TR>
<TR><TD VALIGN=TOP><FONT FACE="Arial">Description</TD>
<TD><TEXTAREA NAME="Description" ROWS=4
COLS=40></TEXTAREA></TD></TR>
<TR><TD VALIGN=TOP><FONT FACE="Arial">Start
Date</TD>
<TD><INPUT TYPE="text" NAME="StartDate"
SIZE=15></TD></TR>
<TR><TD VALIGN=TOP><FONT FACE="Arial">End
Date</TD>
<TD><INPUT TYPE="text" NAME="EndDate"
SIZE=15></TD></TR>
<TR><TD COLSPAN="2" ALIGN="CENTER"><INPUT
TYPE="Submit" VALUE="Enter New Film"></TD></TR>
</FONT>
</TABLE></FORM>
</BODY>
</HTML>
```

database is spectacular. There are any number of tools to perform the low-level trickery. The biggest problem is in choosing from the maze of proprietary solutions, and then performing the initial configuration.■

Each month this page lists all the Shareware files to be found on **apcmag.cd**. Simply browse to the Workshop section to find the files and related reviews.

Shareware summary

Windows 95

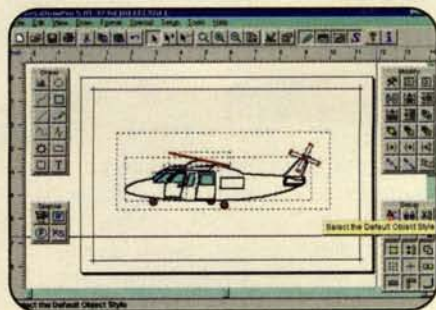
Formula Graphics Multimedia System R97.10.1

A powerful application for creating multimedia presentations using its own extensive object-oriented language, with strong support for animation. Can compile presentations as Java applets for Web publication.



MegaDraw Pro 5.01

A sophisticated vector drawing and cel animation program, particularly well suited to Web publications. It produces very compact XGL graphics language source code, which can be interpreted by a viewer program or browser plug-in.



1 Cool Button Tool 1.2

A versatile design tool for Web page buttons which generates Java applets and doesn't require knowledge of Java or HTML coding.

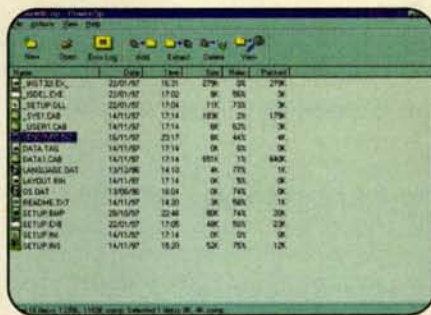
LifeTrax

An attractively presented personal information manager for handling appointments, task lists and contact details. It

incorporates useful note-taking and archiving capabilities.

PowerZip 3.51

A useful archive management tool which integrates well with the Windows 95 environment. Handles ZIP, RAR and TAR archives internally, and ARJ archives with relevant external software. Can generate self-extracting archives.



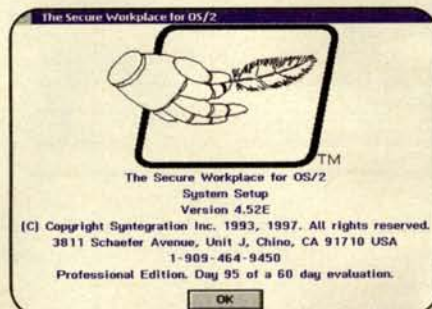
Site of the Month Ganggang

For an excellent source of Australian produced shareware, pay a visit to <http://www.ganggang.com.au/default.htm>. The Ganggang site is organised by software category and includes ratings and brief reviews.

OS/2

The Secure Workplace for OS/2 4.52E

The Secure Workplace for OS/2 is a well-documented, powerful and intuitive utility. It will protect OS/2 workstations from most unwanted intrusions and alterations.

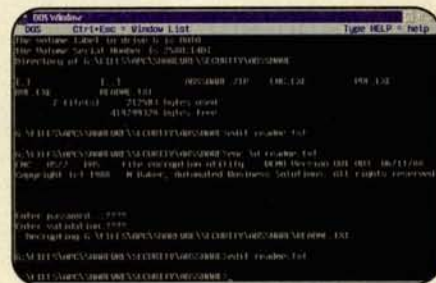


SSH for OS/2 03 (port) 1.2.13

SSH (Secure Shell) is a set of text-mode utilities that can be very useful. Generally speaking, it is a program that allows you to log into a remote computer over a network, execute commands, and copy/move files between it and your computer — very useful if you have workstations at home and the office, and you need to bridge the gap.

ENC DOS-OS/2 001.003

ENC is really a DOS-based, small, simple file encryption utility. All you do to encrypt a file is run ENC with the encryption switch (enc \e filename.ext), and enter an appropriate password when prompted. Similarly, to decrypt it at the other end, you use the decryption switch (enc \d filename.ext), enter the password, and the file is restored to its original glory.



PMCrypt 1.00.00

A popular static file encryption utility that works on very much the same principle as ENC (above), but includes a PM interface and the ability to use key encryption rather than passwords.

Workplace Security for OS/2 2.1.5

If you ever have the problem of people accessing your folders and files on your



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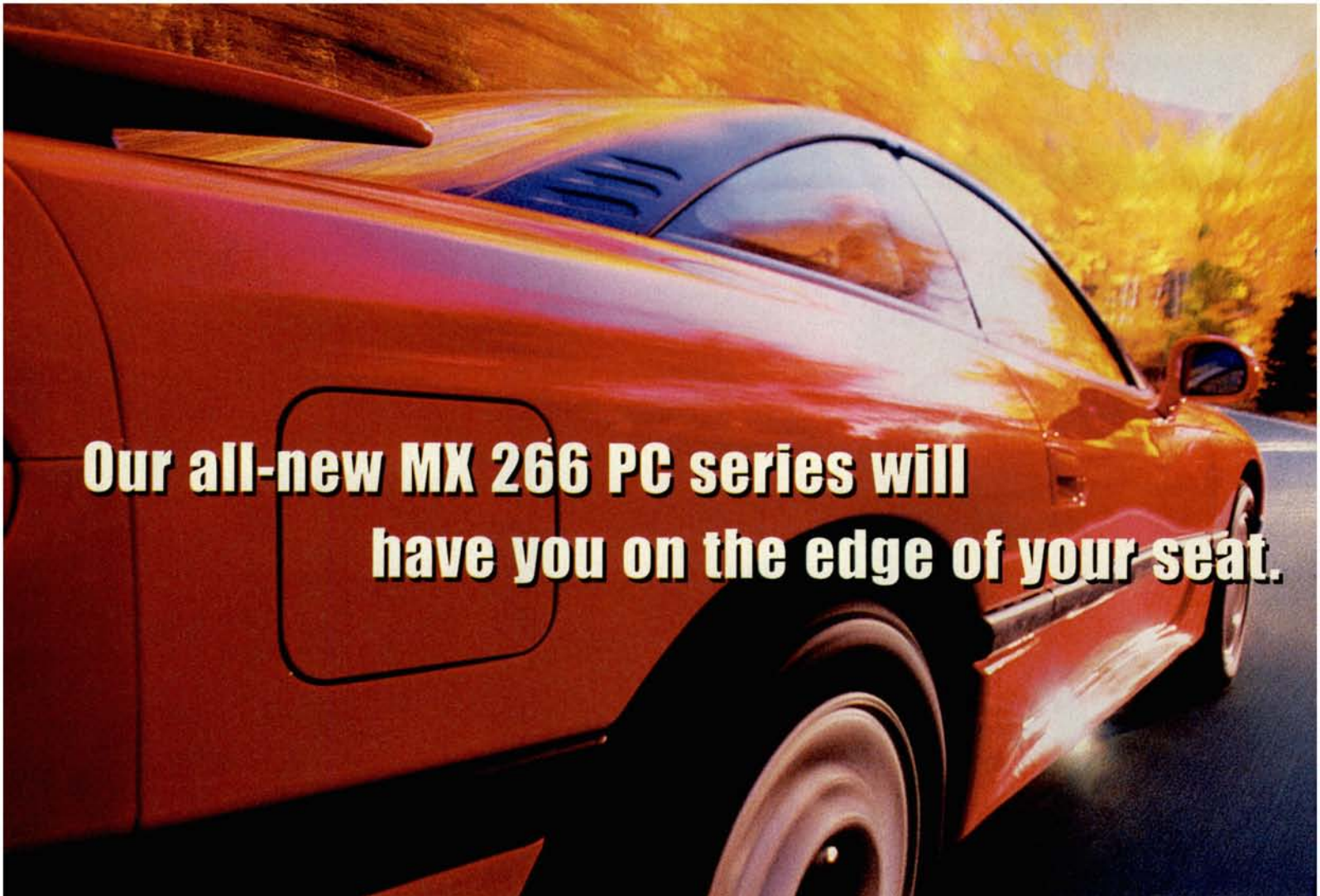
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* Test Configuration*: iWill P55XPlus Mainboard, ALI Aladdin 4+ Chipset, 512K L2 Cache, 32MB SDRAM, Adaptec 2940AU SCSI-3 PCI Adapter, Seagate Barracuda SCSI-3 HD, Matrox Millennium 4Mb Video Card, Windows 95 running at 1024x768 16 bit color. Pentium II configurations use the Asus P2L97 Mainboard with Intel "LX" Chipset, otherwise they are the same. * All results set forth above were obtained through benchmarking performed by KeyLabs, Inc., an independent laboratory not affiliated with IBM. Two different motherboards are used in the benchmark testing due to the module form factor differences between processors. Every effort has been made to configure systems with comparable performing hardware components. * EDGE MX266 components may differ. * 6x86 and the 6x86MX logo are trademarks of Cyrix Corp. * MMX and Pentium are trademarks of Intel Corp. * AMD-K6 is a trademark of Advanced Micro Devices, Inc. * Windows is a trademark of Microsoft Corp.

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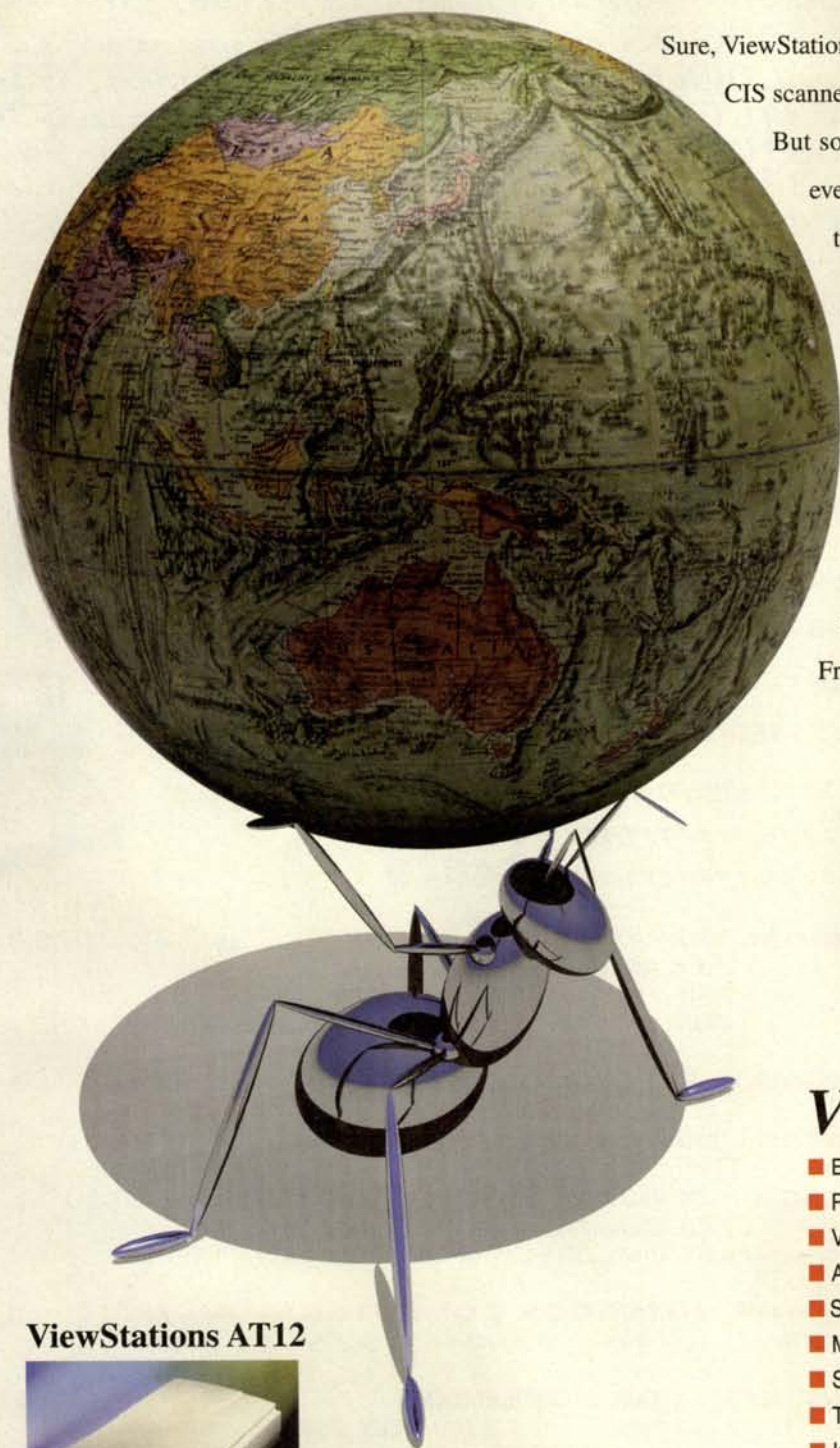
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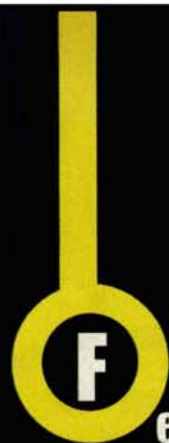
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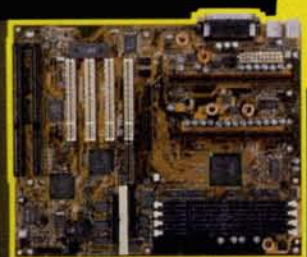
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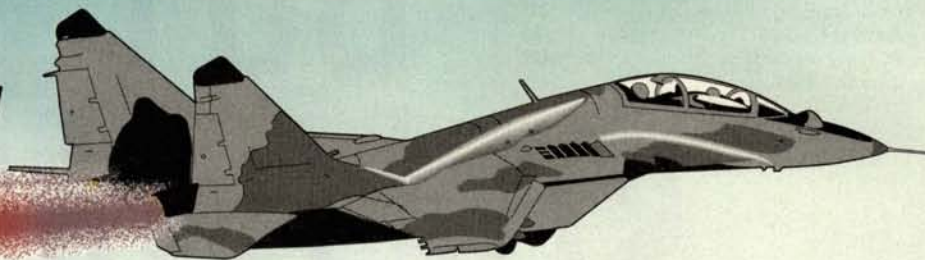


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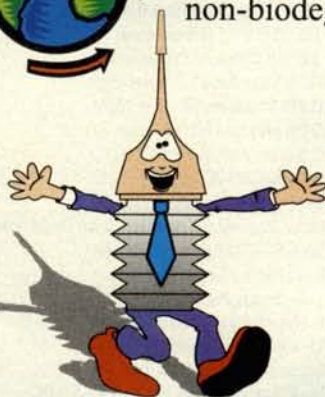
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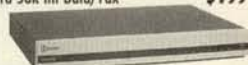
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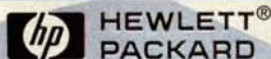
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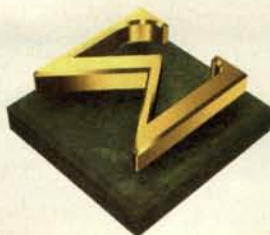
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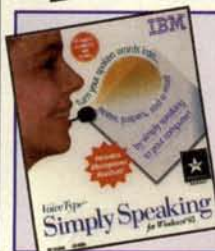


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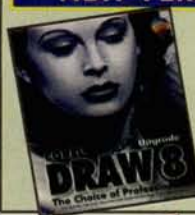
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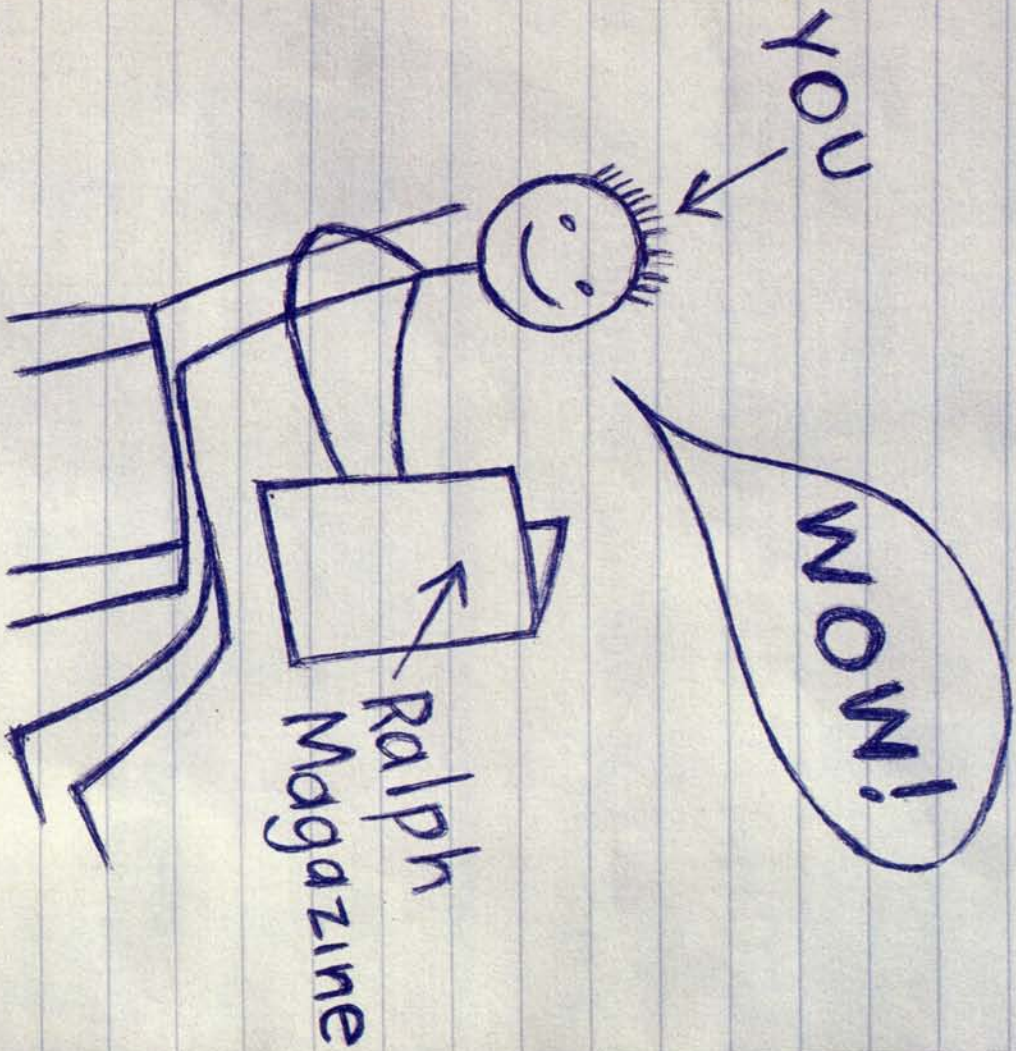
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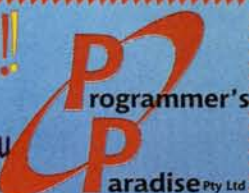
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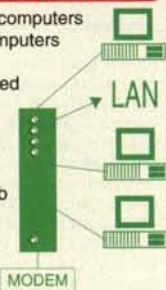
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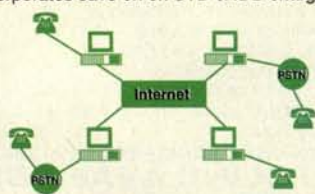
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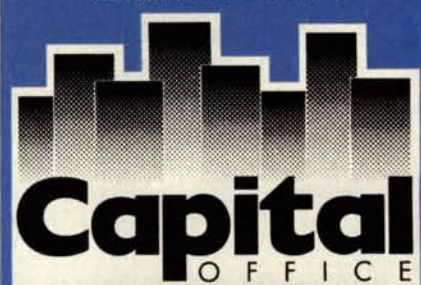
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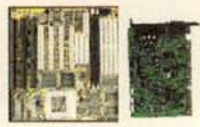
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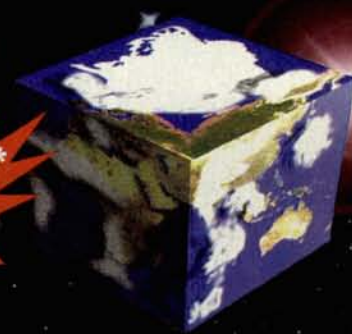
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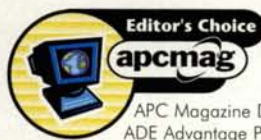
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CPU32



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AMD K6-266 **\$375** CPAMD006

AMD-K6™ Processor - The Smart Choice

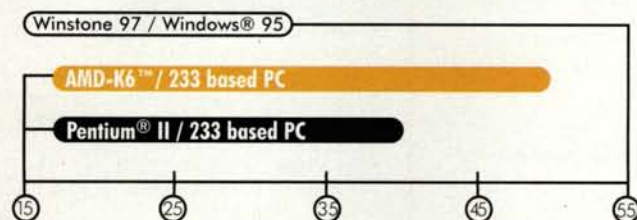
THE SUPERIOR ENGINE FOR WINDOWS® COMPUTING

Building a computer with the AMD-K6 Processor combines lightning speed with outstanding value. With the money you save, you can **add extra performance** options such as more memory, better video card, or a faster modem.

This accelerates system performance dramatically.

The result: A better PC for the money and faster system performance than an equally priced Pentium® II system.

For Equally Priced * PCs, the AMD-K6™ Processor Delivers:
Faster System Performance • More Compelling System Features

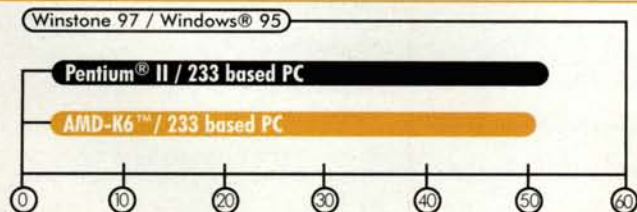


AMD-K6™ / 233 based PC

- 5.1GB Hard Drive
- 32MB SDRAM
- High Performance 4MB Video Card
- 24x CD-ROM
- 56.6 Fax Modem w/Voice
- Wave Table/Sub Woofer
- Windows 95 + S/W Bundle

Pentium® II 233 based PC

- 2.5GB Hard Drive
- 16MB SDRAM
- High Performance 2MB Video Card
- 24x CD-ROM
- 33.6 Fax Modem w/Voice
- 16-Bit Audio
- Windows 95 + S/W Bundle



For Equally Configured PCs,
the AMD-K6™ Processor Delivers:
Performance Competitive with Pentium® II

- Matrox Mystique 4MB
- 32MB SDRAM
- Maxtor DiamondMax IDE HD

AMD-K6™ 233 Processor based PC

AMD-K6™ 233 Processor
Chaintech TX Motherboard
32MB SDRAM
3.2GB Ultra ATA Hard Drive
32 Speed CD-ROM Drive
Sound Blaster 16 Sound Card
Jazz 100W 3D Speakers
4MB Diamond Stealth II
15" Colour Monitor
MS Intellimouse and Pad
104 Key Win95 Keyboard
ADE Deluxe Minitor Case
Windows 95 SYADE030

**Flexirent for
\$19.04/W**
36 month term

\$1995

AMD-K6™ 266 Processor based PC

AMD-K6™ 266 Processor
Chaintech TX Motherboard
64MB SDRAM
4.3GB Ultra ATA Hard Drive
32 Speed CD-ROM Drive
Sound Blaster AWE 64 Sound Card
Jazz 300W 3D Speakers
4MB Diamond Viper PCI Graphics Card
17" Colour Monitor
MS Intellimouse and Pad
104 Key Win95 Keyboard
ADE Deluxe Minitor Case
Windows 95 SYADE031

**Flexirent for
\$25.70 P/W**
36 month term

\$2695



Sales staff are available (est) 9am-6pm Monday to Friday, 10am-4pm Saturday
Technical Support (5 Days a week 9am-6pm) Phone (02) 9700 9354



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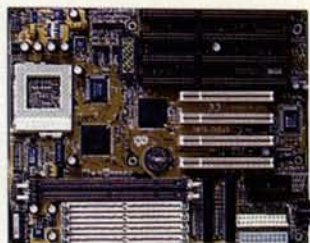
Free Call 5



In a continuing campaign to give it's customers more and more value for their money, CHAINTECH is bundling a total **virus protection solution** with their mainboards, absolutely **free of charge**. The 100% virus protection solution consists of a unique bootsector protection program which is built-in to the mainboard's BIOS, called ChipAway Virus, and the award winning PC-Cillin v3.0 (OEM version) virus protection program.

CHAINTECH'S 5TDM2

has been chosen the **'Testwinner'** in a test conducted by Germany's most popular and influential magazine, PC Magazine.



System Processor: Supports up to 233MHz Pentium® processors, Cyrix/IBM 6x86 (processor rev.2.7 or later) and 6x86L PR120+~PR166+ and 6x86MX PR166-PR233+ processors, AMD KS PR75-PR166 and 166-233 MHz AMD-K6 processors.

• Innovative SeePU technology (simple CPU installation via BIOS)

• Optional Support FAN78 system monitor

ChipSet: Intel 82430TX two chip PCIs

• 512 KB built-in Pipelined Burst SRAM

• Supports up to 256MB FP, EDO and Synchronous DRAM modules

Bios: Award System BIOS supports PnP, APM, DMI, Multi-device booting features

PCI IDE: Supports PIO mode 4, multi-word DMA mode 2 and Ultra DMA-33 timings

• 2S(16550A compliant) + 1P(SPP/ECP/EPP)

+ 1FD (up to 2.88MB, 3 Mode, 1Mbps transfer rate)

• Supports IRDA IR function

• Dual Channel USB Connector

Features: 68/75/83 MHz system frequencies possibility

• Supports Software power off control,

Override power button, Modem ring

power-on and Power-on by alarm

• Flash BIOS protect, Reset switch protect via BIOS

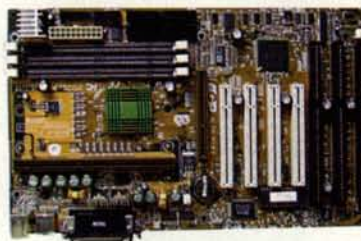
• Poly-switch overcurrent protection for USB and keyboard



MBCHA000

\$135

The new **CHAINTECH 6LTM2** mainboard is based on the **award winning** 6LTM mainboard.



System Processor: Supports up to 333MHz Intel Pentium II processors

• Slot 1 CPU socket with retention mechanism

• Supports 60/66 Mhz system clock speeds

• Innovative SeePU technology (Jumper free CPU installation via BIOS)

ChipSet: Intel 82440LX two chip PCIs

• AGP (Accelerated Graphics Port) Slot

• DRAM Memory Supports up to 384Mb EDO and Synchronous DRAM modules

Bios: Provides single bit ECC capability

• Boot-block Flash BIOS Award System BIOS

supports PnP, APM, DMI, Multi-device booting features

PCI IDE: Supports up to PIO Mode 4,

Multiword Mode 2 and Ultra DMA-33

timings

On Board Ultra I/O

2S(16550A compliant) + 1P(SPP/ECP/EPP)

+ 1FD (up to 2.88MB, 3 Mode and 1Mbps

transfer rate)

• Supports IrDA IR function

• Two USB ports On Board

Features: 68/75/83MHz system frequencies

possibility.

• Supports Software power off control,

Override power button, keyboard power-on,

Modem ring power-on and Power-on by

alarm

• Flash BIOS protect, Reset switch protect via

BIOS

• Poly-switch overcurrent protection for USB

and keyboard.

MBCHA001

\$215

Value for money

CHAINTECH

Pentium mainboard with all the advanced features including **UDMA** and **SDRAM** support.



System Processor: Supports up to 233MHz

Pentium® processors, Cyrix/IBM

6x86/6x86L PR120+ ~PR233+ (processor

rev. 2.7 or later) and 6x86MX

PR166+~PR200+ processors, AMD

K5™ PR75~PR166 and 166~266Mhz

K6 processors

ChipSet: SIS 5582 single chip PCIs

• Cache Memory 512 KB built-in Pipelined

Burst SRAM

• DRAM Memory Supports up to 256MB FP,

EDO, Synchronous DRAM modules

• Provides up to 128MB DRAM cacheability

Bios: Boot-block Flash ROM

• Award System BIOS with PnP, APM, DMI,

Multi-device booting features

PCI IDE: Special PCI Asynchronous Mode for

50/75/83 Mhz system frequencies possible.

• Supports PIO Mode 4, Multi-word DMA

Mode 2 and Ultra DMA-33 timings

• Bus Mastering software drivers for all

well-known multi-task operating systems.

On-Board Ultra I/O

2S(16550A) + 1P(SPP/ECP/EPP) + 1FD

(up to 2.88MB, 3 Mode and 1Mbps

transfer rate)

• Supports IrDA IR function

• Dual Channel USB Connector

Features: ATX power supply connector

supports Software power off control,

Override power button, Modem ring

power-on and Power-on by alarm

• Flash BIOS protect, Reset switch protect

via BIOS

• Poly-switch overcurrent protection for USB

and keyboard

MBCHA002

\$119

CHAINTECH'S 6BTM

System Processor:

• Supports up to 450MHz Intel Pentium II processors

• Slot 1 CPU socket with retention mechanism

• Supports 66/100MHz system clock speeds

• Innovative CPU technology (simple CPU installation

via BIOS)

ChipSet:

• Intel 82440BX two chip PCIs

Bios:

• Award System BIOS with PnP, APM, DMI,

CPU throttling and Multi-device booting features

Ultra DMA-33 IDE Ports:

• Supports up to PIO Mode 4, Multi-word DMA

Mode 2 and Ultra DMA-33 timings

• Bus Mastering software drivers for all

well-known multi-task operating systems.

On-Board Ultra I/O

2S(16550A compliant) + 1P(SPP/ECP/EPP)

+ 1FD (up to 2.88MB, 3 Mode and 1Mbps

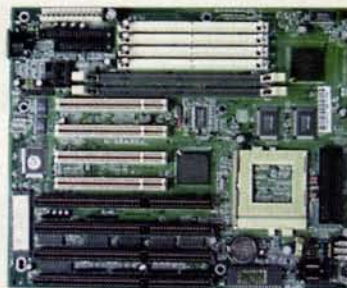
transfer rate)

• Supports IrDA IR function

MBCHA003

\$285

new



MBDTK002

\$135

DTK Pentium TX High Performance Mainboard PAM-00571

PAM-00571 AT Pentium PCI/ISA. Intel 82430TX Chipset High Performance Mainboard

1. CPU/System Temperature Monitoring
2. Switching Voltage Regulator Support
3. Four 32-bit Master PCI
4. Four 16-bit ISA
5. On board supports two USB ports for USB devices

System Processor

Intel Pentium, MMX series, Cyrix 6x86, M2 series and AMD K5, K6 series, up to 233Mhz Pipeline Burst Mode SRAM size 512Kb

Main Memory

1. Four 72-pin SIMM Socket, support both FP Mode DRAM Modules configuration up to 256Mb
2. Two 168-pin DIMM Socket, support 3.3V SDRAM configuration up to 256MB

Intel 82430TX PC1set

Bios System

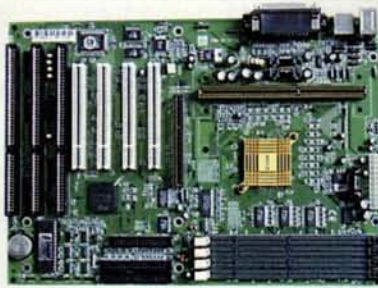
1. Award/AMI
2. Supports Flash ROM BIOS
3. Supports Plug "n" Play

Multi I/O

1. On board Multi I/O supports two serial, one parallel port and floppy drive controller
2. Serial Ports are 16550 Fast UART compatible
3. Parallel port has EPP and ECP capabilities
1. Four 32-bit Master PCI
2. Four 16-bit ISA

PCI IDE

1. PCI Master IDE controller supports PIO Mode 3 and 4 devices, I/O data transfer rate can be up to 17Mb/s
2. Supports Ultra DMA33



MBDTK005

\$215

DTK Pentium II LX Mainboard PRM-00761

PRM-00761 PCI/ISA Single Processor ATX Format Intel 82440LX High Performance Mainboard

1. CPU/System Temperature Monitoring
2. Switching Voltage Regulator Support
3. Four 32-bit Master/Slave PCI
4. Three 16-bit ISA
5. One 64-bit AGP(66Mhz)
6. On board supports two USB ports for USB devices

System Processor

Intel Pentium II series, up to 333Mhz

Main Memory

1. Four DIMM Sockets, memory configurations up to 512Mb
2. Supports both Synchronous DRAM and EDO Mode Modules
3. ECC Function ensures data correction and integrity

Intel 82440LX PCI set

Bios System

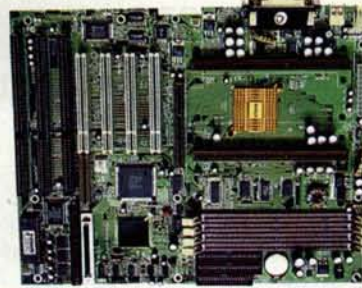
1. Award/AMI
2. Supports Flash ROM BIOS
3. Supports Plug "n" Play

Multi I/O

1. On board Multi I/O supports two serial, one parallel port and floppy drive controller
2. Serial ports are 16550 Fast UART compatible
3. Parallel Port has EPP and ECP capabilities
4. Irda Allows serial communication at baud rates of up to 4Mbps
1. Four 32-bit Master/Slave PCI
2. Three 16-bit ISA
3. One 64-bit AGP(66Mhz)

PCI IDE

1. PCI Master IDE controller supports PIO Mode 3 and 4 devices, I/O data transfer rate can be up to 17Mb/s
 2. Support Ultra DMA33
- True green functions, Support SMM, SMI and CPU stop clock functions



MBDTK006

\$545

DTK Dual Pentium II LX High Performance Mainboard PAM-00771

PRM-00771 E PCI/ISA Dual Processor ATX Format

Intel 82440LX High Performance Mainboard Dual Intel Pentium II series, up to 333Mhz

1. CPU/System Temperature Monitoring
2. Switching Voltage Regulator Support
3. Four 32-bit Master/Slave PCI
4. Three 16-bit ISA
5. One 64-bit AGP (66Mhz)
6. On board supports two USB ports for USB devices

Main Memory

1. Four DIMM Sockets, Memory configurations up to 512Mb
2. Supports both Synchronous DRAM and EDO Mode DRAM Modules
3. ECC Function ensure data correction and integrity

Intel 82440LX PC1set

Bios System

1. Award/AMI
2. Supports Flash ROM BIOS

On Board U/W SCSI Controller

3. Supports Plug "n" Play

Multi I/O

1. On board Multi I/O supports two serial, one parallel port and floppy drive controller
2. Serial Ports are 16550 Fast UART compatible
3. Parallel port has EPP and ECP capabilities
4. Irda allows serial communication at baud rates up to 4Mbps

PCI IDE

1. PCI Master IDE controller supports PIO Mode 3 and 4 devices, I/O data transfer rate can be up to 17Mb/s
 2. Supports Ultra DMA33
 3. Adaptec 7880 Wide Ultra SCSI
- True green functions, Support SMM, SMI and CPU stop clock functions



DTK Pentium II ATX Mainboard PRM-0080i

System Processor:

Dual Pentium II up to 450MHz
ACPI / Ultra DMA 33 / AGP port
Switching Voltage Regulator
Support 4 DIMM (3.3v) up to 512MB
4 PCI + 3 ISA + 1 AGP slot

ChipSet:

Intel 82440BX
SMC 37C72

MBDTK008

\$279

DTK Dual Pentium II ATX Mainboard PRM-0081i

System Processor:

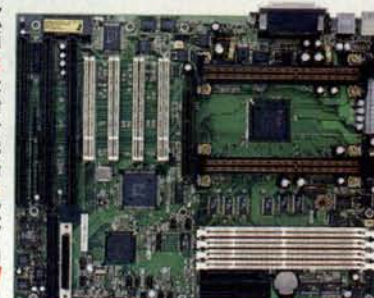
Dual Pentium II up to 450MHz
ACPI / Ultra DMA 33 / AGP port
Switching Voltage Regulator
Support 4 DIMM (3.3v) up to 512MB
4 PCI + 3 ISA + 1 AGP slot

ChipSet:

Intel 82440BX
Winbond 83977
Adaptec AIC-7880 Ultra Wide SCSI

MBDTK009

\$Call



Hard Disks

Quantum Fireball SE

Quantum
CAPACITY FOR THE EXTRAORDINARY™

Blistering Fast, High performance drives for the desktop or workstation

The Fireball SE range of hard drives builds on Quantum's renowned reputation of **quality** and **performance**. It has a fast average seek time - 9.5 milliseconds and internal data rates up to 158 megabits per second at 5400 rpm. It also uses the Ultra ATA interface, with a data burst transfer rate of 33.3 megabytes per second. Furthermore the **Fireball SE is available in both IDE and SCSI models.**

IDE 3.5" - Fireball SE



Code	Model	Capacity (GB)	Cache	Interface	Transfer Rate	Price
HDQTM017	Fireball SE	2.1	128KB	UDMA	33MB/s	\$290
HDQTM018	Fireball SE	3.2	128KB	UDMA	33MB/s	\$335
HDQTM019	Fireball SE	4.3	128KB	UDMA	33MB/s	\$380
HDQTM020	Fireball SE	6.4	128KB	UDMA	33MB/s	\$495
HDQTM021	Fireball SE	8.4	128KB	UDMA	33MB/s	\$635

SCSI 3.5" - Fireball ST Ultra SCSI

Code	Model	Capacity (GB)	Cache	Interface	Transfer Rate	Price
HDQTM022	Fireball SE	2.1	512KB	Ultra	20MB/s	\$385
HDQTM023	Fireball SE	3.2	512KB	Ultra	20MB/s	\$465
HDQTM024	Fireball SE	4.3	512KB	Ultra	20MB/s	\$530
HDQTM025	Fireball SE	6.4	512KB	Ultra	20MB/s	\$675
HDQTM026	Fireball SE	8.4	512KB	Ultra	20MB/s	\$875

Seagate SCSI



Seagate

The Barracuda range of SCSI hard drives provide **unmatched performance** and **reliability** for workstations and file servers. With **motor speeds of 7200 rpm** and **an average seek time of 8ms**, these drives are able to cater for the most demanding applications.

SCSI 3.5" - Seagate Barracuda

Code	Model	Capacity (GB)	Cache	Interface	Transfer Rate	Price
HDSGT011	Barracuda 4XL	4.5	512KB	Ultra	20MB/s	\$1095
HDSGT012	Barracuda 4XL	4.5	512KB	Ultra Wide	40MB/s	\$1195
HDSGT013	Barracuda 9	9.1	512KB	Ultra	20MB/s	\$1495
HDSGT014	Barracuda 9	9.1	512KB	Ultra Wide	40MB/s	\$1595

Maxtor Hard Disk Drives

ULTRA DMA

Maxtor's DiamondMax™ EIDE hard drives have a reputation for **outstanding performance** and **reliability**. The new DiamondMax™ 2880 series is no exception. These drives sport up to 11.5 GB of formatted capacity and a 9.0ms seek time. This drive also features Formula4™ HDA and DSP-based electronics architecture, making it one of the best-performing drives in the industry. **New 11.5 GB from Maxtor!**



Maxtor 2880 SERIES

Code	Model	Cap.GB	Seek ms	Motor RPM	Price
HDMAX010	DIAMONDMAX	2.8	<9.0	5400	\$Call
HDMAX011	DIAMONDMAX	5.7	<9.0	5400	\$Call
HDMAX012	DIAMONDMAX	8.4	<9.0	5400	\$Call
HDMAX013	DIAMONDMAX	11.5	<9.0	5400	\$Call

Maxtor 2160 SERIES

Code	Model	Cap.GB	Seek ms	Motor RPM	Price
HDMAX003	DIAMONDMAX	2.1	<9.7	5200	\$275
HDMAX004	DIAMONDMAX	4.3	<9.7	5200	\$375
HDMAX007	DIAMONDMAX	6.4	<9.7	5200	\$455
HDMAX009	DIAMONDMAX	8.4	<9.7	5200	\$635

TOSHIBA Laptops

LAPTOPS

Adelony Computers



Flexirent for
\$32.70 P/W
36 month term

Satellite 310CDS NBTO5007 \$3495

Pentium® 200MHz with MMX Technology,
PCI Bus, 12.1" SVGA Colour DSTN Display,
32MB RAM, 2GB HDD, FDD, Max 16x Int CD-ROM,
Li-Ion Battery, MS Windows '95,
1 Year Warranty, Internal Floppy

TOSHIBA provides customers with international parts and labour warranties for 12 months on its value notebooks and 3 years on all other Toshiba mobile computers. Following its philosophy of computing anywhere, anytime. Toshiba has launched a series of **new LAPTOPS**.

The Value Notebook Range

Satellite 300CDS NBTO5013 \$2795

Pentium® 166MHz with MMX Technology,
PCI Bus, 12.1" SVGA Colour DSTN Display,
16MB RAM, 2GB HDD, FDD, Max 16x Int CD-ROM,
Li-Ion Battery, MS Windows '95,
1 Year Warranty, Internal Floppy

Flexirent for
\$26.70 P/W
36 month term

Satellite 300CDT NBTO5008 \$3495

As 300CDS with an active colour screen.

Flexirent for
\$32.70 P/W
36 month term

Satellite 310CDT NBTO5014 \$4395

As 310CDS with an active colour screen.

Flexirent for
\$41.20 P/W
36 month term

Business Professional Range

Satellite Pro 470CDT NBTO5015 \$4495

Satellite Pro 480CDT NBTO5009 \$5299

Tecra 550CDT NBTO5010 \$6300

Satellite Pro 490CDT NBTO5018 \$6850

Satellite Pro 490XCDT NBTO5019 \$7950



Mini Notebook

Libretto 100CT

\$Call NBTO5016



Toshiba Performance Range

Tecra 780DVD

\$9495 NBTO5017



Laptops

2 Year
Warranty

DTK Intel 200MMX NBBDTK000 \$2980

12.1" Colour TFT LCD
Intel Pentium 200MHz CPU with MMX Technology
Intel TX Chipset, 512KB Cache
16MB RAM EDO
2GB HDD
ESS 1869 16-Bit Stereo, 3D Audio
2MB Video EDO DRAM

Flexirent for
\$27.00P/W
36 month term

89-Key Win95 Keyboard, Touchpad
PCMCIA Port (1x Type III or 2x Type II)
1xs, 1xp, 1xCRT, 1xPS/2, 1xFIR,
1xUSB, 1xTV OUT, 1xGAME
20xCD-ROM
1.44MB FDD w/External Cable
Li-Ion Battery
AC/DC Adaptor, CARR BAG



DTK Intel 233MMX NBBDTK001 \$3450

12.1" Colour TFT LCD
Intel Pentium 233MHz CPU with MMX Technology
Intel TX Chipset, 512KB Cache
32MB RAM EDO
3GB HDD
ESS 1869 16-Bit Stereo, 3D Audio
2MB Video EDO DRAM

Flexirent for
\$31.00 P/W
36 month term

89-Key Win95 Keyboard, Touchpad
PCMCIA Port (1x Type III or 2x Type II)
1xs, 1xp, 1xCRT, 1xPS/2, 1xFIR,
1xUSB, 1xTV OUT, 1xGAME
20xCD-ROM
1.44MB FDD w/External Cable
Li-Ion Battery
AC/DC Adaptor, CARR BAG



SODIMM
— 144Pin SODIMM MODULE
— Support Both DRAM and SDRAM

DTK AMDK6-266 NBBDTK002 \$3420

12.1" Colour TFT LCD
AMD K6-266MHz CPU with MMX Technology
Intel TX Chipset, 512KB Cache
32MB RAM EDO
3GB HDD
ESS 1869 16-Bit Stereo, 3D Audio
2MB Video EDO DRAM

Flexirent for
\$30.60P/W
36 month term

89-Key Win95 Keyboard, Touchpad
PCMCIA Port (1x Type III or 2x Type II)
1xs, 1xp, 1xCRT, 1xPS/2, 1xFIR,
1xUSB, 1xTV OUT, 1xGAME
20xCD-ROM
1.44MB FDD w/External Cable
Li-Ion Battery
AC/DC Adaptor, CARR BAG



CD-ROM Drive
— Swappable with FDD
— Swappable with 2" Battery Pack

Sales staff are available (est) 9am-6pm Monday to Friday, 10am-4pm Saturday
Technical Support (5 Days a week 9am-6pm) Phone (02) 9700 9354



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1800 626 345

Free Call

*please read our Terms and Conditions

DISPLAY CARDS

SOUND CARDS

Audio & Visual

Generic Display Cards

Code	Model
DCGEN000	1 MB ISA SVGA card
DCGEN001	1 MB S3 PCI SVGA card (upgradeable to 2Mb)
DCGEN003	1MB EDO upgrade for S3
DCGEN008	2MB S3 Virge 3D PCI
DCCHA000	4MB Cirrus 3D AGP Card



Price
\$49
\$40
\$20
\$75
\$125



3D AGP GRAPHICS CARD **new**

Cirrus Logic Laguna family.

- Internal 64-bit GUI engine and advanced Texture Map Management support leading 2D and 3D acceleration
- Guaranteed flicker-free by supporting up to 85Hz refresh rate and 1600x1200x1256 resolution
- Provides up to 4Mb advanced Rambus DRAM
- Supports smooth, full screen video playback

DCCHA000

\$125

matrox Cards

Code	Model
DCMAT016	4MB SGRAM Matrox Mystique 220
DCMAT013	4MB WRAM Matrox Millennium II
DCMAT004	8MB WRAM Matrox Millennium II
DCMAT019	4MB SGRAM Matrox M3D
DCMAT017	4MB WRAM For Millennium II
DCMAT020	4MB PRODUCTIVA AGP OEM
DCMAT021	8MB PRODUCTIVA AGP



Price
\$245
\$375
\$535
\$225
\$295
\$195
\$255

THE PRODUCTIVA IS BASED ON THE NEW CHIP MGA-G100 CHIP.

- Top priority among business users is 2D performance, the Productiva delivers the fastest 2D acceleration available, with support for 24-bit per pixel at 1600x1200 resolution.
- The new G100 chip offers high quality video playback and improved 3D performance. The MGA-G100 chip integrates a 230 MHz RAMDAC for high refresh rates up to 85Hz at 1600x1200.
- The 8Mb Productiva G100's integrated 3D engine allows entry level CAD and animation users to display 3D images in resolutions as high as 1024x768 at 16-bit (double buffered with 16-bit Z-buffered).

UPGRADES FOR PREVIOUS MATROX CARDS

DCMAT006	4MB WRAM For 4MB Millennium Card
DCMAT009	2MB SGRAM For Mystique Card
DCMAT010	4MB SGRAM For Mystique Card



\$245
\$95
\$155

miro Cards

Code	Model
MMMIR000	Miro PCTV
MMMIR001	Miro DC10 PCI Media Studio 2.5
MMMIR004	Miro DC20 plus Media Studio 5
MMMIR002	Miro DC30 plus

Price
\$255
\$675
\$1150
\$2095

Video-data-rate up to 7 MB/sec.

Perfect audio-integration with lip-sync playback in CD-quality

Fast effect rendering due to hardware acceleration

Only edited sequences will be rendered

All video-standards: PAL, NTSC, SECAM (Input only) and CCIR 601 Pixelformat.

Includes Adobe Premier 4.2



MMGEN005



Generic Sound Cards

Generic 16-Bit PnP Sound Card:	MMGEN005	\$35
Generic S3 PCI Sound Card:	MMGEN019	\$65

Accelerate your PC!

STEALTH II S220

Radical 2D/3D Gaming!

Delivers outrageous 2D graphics performance and millions of colours

- 187 million 3D Winmarks!
- Combined 2D and 3D on one card
- 4MB SGRAM for optimal graphics display

APC Magazine voted
"Best Value" - March 1998



DCDIA010 **\$235**



VIPER V330

128-Bit Power!



Experience uncompromising 3D gaming, hyper-fast Windows® business graphics, and smooth full screen video.

- True 128-bit power for incredible 2D, 3D and video!
- Retail package includes 8 hot games and applications
- PCI and AGP versions available

PCI DCDIA006 **\$375**
AGP DCDIA007



MONSTER 3D II

The Fastest 3D Gaming!

This is 3D more shockingly real than anything you've ever seen! Outrageous speed and deadly detail will transform your PC gaming into a mind blowing 3D experience.

- Explosive speed at over 60 frames/sec
- 3 times as much power as our award-winning original Monster
- 3Dfx Voodoo 2 technology



MMDIA003 **\$495**



MONSTER SOUND M80

Heart-Pounding 3D Sound for Games!

Monster Sound M80 immerses you in sound and puts you in the middle of the action. Sounds move independently on X, Y and Z axis delivering all encompassing audio that reacts to your every game move.



- The only sound card that puts you INSIDE your PC games
- Revolutionary true positional audio uses NASA technology
- Add in design works with existing sound cards

MMDIA004 **\$219**



SONIC IMPACT S70

Want a Faster PC?

Sonic Impact's PCI audio technology gives you more power, as it brings to life the hottest games, multimedia software and interactive web sites. A fantastic combination of performance, quality and price.

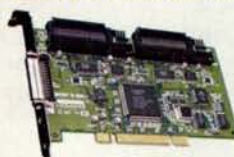
- Efficient PCI design accelerates your entire PC
- 64 true hardware wavetable voices
- Blazing performance, crystal clear quality.
- Unbelievable price



MMDIA005 **\$Call**

FIREPORT ULTRASCSI

UltraSCSI with Diamond Performance!



- Top performance UltraSCSI just got affordable!
- External 50-pin connector means you don't need an extra adapter
- Free UltraEasy™ Diagnostics

FirePort 20
• UltraSCSI

\$199

CCDIA000

FirePort 40
• Ultrawide SCSI

\$375

CCDIA001

FirePort 40 Dual
• Dual Channels

\$545

CCDIA002

MONSTER 3D

Killer 3D for Your PC!

Monster 3D brings arcade gaming to your PC with awesome 3D graphics. Monster 3D works with your existing graphics card to transform your ordinary computer, into a monstrous gaming machine.



- Best value for accelerating new and older PC systems
- Hot 3Dfx Voodoo acceleration for Direct3D, GLIDE and OpenGL games
- World's #1 3D graphics accelerator

MMDIA000 **\$295**

SOUND CARDS

CONTROL CARDS

CREATIVE Multimedia



Awesome Features of the Sound Blaster™ AWE64 Value: MMCRE011 **\$165**

- Reproduces Sound from a Library of Real, Hi-Fidelity Samples or SoundFonts™
- Delivers AWESome Audio with Advanced WavEffects™ Synthesis
- Creative WaveGuide Synthesis for Natural Expressive Sound
- Powerful Synthesizers

Graphics Blaster Extreme MMCRE008 **\$345**

The Winning 2D/3D Overall Graphics Performance Ever

- Lightning fast 2D, 3D and enhanced video playback for all your graphics applications
- 4MB of SGRAM and a 230MHz DAC to deliver the highest performance, resolutions and refresh rates
- Performance tuned drivers for Windows 95 and Windows NT4.0, including full support for OpenGL, DirectX and HEIDI
- Modular Connectors provide upgradeability to Creative's Dxr2 PC-DVD Playback or Video and TV Output



Code	Model	Price
MMCRE012	Sound Blaster™ AWE64 Gold	\$395
MMCRE013	Sound Blaster™ 16	\$75
MMCRE016	Encore PC-DVD	\$745
MMCRE023	3D Blaster Voodoo 2 8M	\$495
MMCRE024	3D Blaster Voodoo 2 12M	\$675

Control Cards

I/O CONTROL CARDS

Code	Model	Price
CCGEN000	ISA MULTI I/O	\$35
CCGEN015	ISA PRINT CARD	\$25

Adaptec, the industry standard in entry level and high end SCSI controllers. Now available in both OEM and Retail packaging.



Legend:

U = Ultra

UW = Ultra Wide

K = retail kit with cables, software and drivers

ADAPTEC DESKTOP SCSI

Suited for the personal workstation and entry level servers.

Code	Model	Tfr Rate Mb/s	Price
CCGEN001	AHA-1520	10	\$165
CCGEN003	AHA-2940U	20	\$355
CCGEN004	AHA-2940UK	20	\$415
CCGEN005	AHA-2940UW	40	\$395
CCGEN006	AHA-2940UWK	40	\$495

ADAPTEC PCI HIGH-END SCSI

Suited to mid to high end servers.

Code	Model	Tfr Rate Mb/s	Price
CCGEN007	AHA-3940U	40	\$695
CCGEN013	AHA-3940UK	40	\$795
CCGEN008	AHA-3940UW	80	\$795
CCGEN014	AHA-3940UWK	80	\$845

ADAPTEC ARRAY ADAPTER KITS (RAID)

Aimed at servers running mission critical applications.

Code	Model	Tfr Rate Mb/s	Price
CCGEN009	AAA131K	40	\$835
CCGEN010	AAA133K	120	\$1390

ADAPTEC SLIM SCSI FOR NOTEBOOK

Code	Model	Tfr Rate Mb/s	Price
CCGEN011	AHA1460	20	\$325

JAZZ Speakers

SPEAKERS



Model: J-100 Speaker
Peak Power Output: 100W
Drivers: One 3" Full Range Cone
W x H x D: 127mmx280mmx127mm
Code: MMJAZ001
Price: **\$75**

Model: J-200 Speaker
Peak Power Output: 200W
Drivers: One 3" Full Range Cone
 One 1" High Range Cone
W x H x D: 127mmx280mmx127mm
Code: MMJAZ002
Price: **\$95**



J-900
J-300
Adjustable 3D Sound
 Models JS-200 and JS-300 offer customised 3D sound control not found on any other multimedia speaker. With the simple flip of the 3D sound to match your current application.



J-900 Subwoofer
 • Peak Music Power Output: 300W
 • Drivers: 4" Woofer Cone
 • Frequency Response: 35Hz-250Hz
 • Controls: Power, ON/OFF, Volume
 • Input: 3.5mm Phone Jack
 DC Input Jack
 • Indicator: Power Led
 • (WxHxD): 320mmx220mmx150mm
Code: MMJAZ004
Price: **\$109**

J-300 Speaker
300W
 Two 3" Mid Range Cone
 One 1" High Range Cone
W x H x D: 127mmx280mmx127mm
Code: MMJAZ003
Price: **\$109**

J-930 Subwoofer & Speaker
 (J-900 + J-300)
 Includes:
 J-900 subwoofer
 & J-300 speakers
Code: MMJAZ005
Price: **\$199**

J-908ST Subwoofer & Speaker

• Peak Music Power Output: 400W
 • Drivers: One 4" Subwoofer Cone
 One 3" Full Range Cone
 One 1" High Range Cone
 • Freq Response: Subwoofer 35Hz-250Hz
 Satellites 100Hz-15KHz
 • 3D Controls: On/Off
 • Controls: Power/Volume
 • Input: 3.5mm Stereo Plug
 • Output: RCA Jack
 • Indicator: Power LED
Code: MMJAZ015
Price: **\$155**



J-HS14 Microphone
 Multimedia combination headset and boom microphone
Code: MMJAZ009
Price: **\$19**



J-S124 Microphone
 Desktop Microphone including base
 Input: 3.5mm Mini Stereo jack
Code: MMJAZ008
Price: **\$15**



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new iomega.

Zip Plus

Everything a Zip drive has ...
...Plus more!

Up to 50X Faster Than a Floppy Drive. In Win95.
One Drive Fits All SCSI and Parallel Ports
Lightweight Universal Power Supply
Hot Multimedia Software
Power On Off Switch.

Zip Plus Software:

- ImageAXS
- NetCard
- Recordit
- Web Buddy
- PhotoDelux
- Zip Tools



\$355



The revolutionary storage standard
The **Zip** drive comes with some
pretty nifty features:

- It's **portable** so you can move files from work to home and back again.
- 100 Megabyte disks allow you to organise and store all your stuff. When you get more stuff, just get more disks.
- Zip™ Tools software will help you store, share, back up, organise and manage all that stuff.

\$259

BUIOM000

Jaz

Code	Model	Price
BUIOM004	JAZ DRIVE (SCSI INT.) - 1.0GB	\$455
BUIOM003	JAZ DRIVE (SCSI EXT.) - 1.0GB	\$499

Zip

Code	Model	Price
BUIOM000	ZIP DRIVE EXT. (PARALLEL PORT) - 100MB	\$259
BUIOM001	ZIP DRIVE EXT. (SCSI PORT) - 100MB	\$259
BUIOM007	100MB ZIP INT IDE	\$185
BUIOM011	ZIP PLUS	\$355

new

JAZ 2GB

Super fast, extremely vast storage!!

• the super fast way to store, transport, and use your computer media with **no limit** to the number of disks you wish to use.



JAZ 2GB Internal BUIOM017 **\$1199**
JAZ 2GB External BUIOM018 **\$1379**

jaz

The **Jaz** drive

comes with some pretty cool features:

- With **whopping 1GB** (yeah, gigabyte) cartridges, you'll never run out of space.
- 10-12 millisecond seek time means performance faster than most hard drives.
- Lightweight external drive weighs only 2 pounds, so it's very portable. Now connect to your printer port. No SCSI card needed! (with optional Jaz Traveller). Or choose the internal version.
- **New, handier size.**

\$499

BUIOM003

Media Accessories

Code	Model	Price
BUIOM005	100MB PC ZIP DISKS (3 PER PACK)	\$75
BUIOM006	100MB PC ZIP DISKS (10 PER PACK)	\$225
BUIOM010	100MB MAC ZIP DISK	\$25
BUIOM008	JAZ MEDIA 1GB PC DISKS (3 PER PACK)	\$495
BUIOM009	JAZ MEDIA 1GB MAC DISKS (3 PER PACK)	\$495
BUIOM013	IOMEGA JAZ TRAVELLER	\$75
BUIOM014	ZIP DRIVE CARRY CASE	\$22

Backups

BACKUPS

CASES

POWER SUPPLIES

Panasonic

Code	Model	Price
MMPAN000	24x PANASONIC CD-ROM DRIVE	\$135
MMPAN001	24x PANASONIC SCSI CD-ROM DRIVE	\$225
MMPAN002	32x PANASONIC IDE CD-ROM DRIVE	\$175

SONY 3.5" DAT SCSI DRIVES

Code	Model	Price
BUSON000	SONY SDT4000 2/4GB INT DDS-1	\$1195
BUSON001	SONY SDT5000 4/8GB INT DDS-2	\$1395
BUSON003	SONY SDT5000 4/8GB EXT DDS-2	\$1650

Floppy Disks/Drives

FDGEN000	Generic 1.44 FDD	\$35
FDGEN001	Floppy Disks Box of 10	\$10

Tape Cartridges

Code	Model	Price
BUGEN000	QIC80 DC21 120 120MB/250MB COMP	\$39
BUGEN001	QIC-3020 MC300XL 680MB/1.36GB COMP	\$45
BUGEN002	QIC-WIDE 520 200MB/400MB COMP	\$45
BUGEN003	TRAVAN TR-1 400MB/800MB COMP	\$45
BUGEN004	TRAVAN TR-2 800MB/1.6GB COMP	\$45
BUGEN005	TRAVAN TR-3 1.6GB/3.2GB COMP	\$59
BUGEN006	TRAVAN TR-4 4GB/8GB COMP	\$69
BUGEN007	4MM DAT DDS-1 90M 2GB/4GB COMP	\$15
BUGEN008	4MM DAT DDS-2 120M 4GB/8GB COMP	\$25
BUGEN009	4MM DAT DDS-3 125M 12GB/24GB COMP	\$65

Cases & Power Supplies

ADE DELUXE MINI-TOWER CASE

W: 172mm
D: 423mm
H: 347mm

CAADE010

\$85



ADE DELUXE AT/ATX MID CASE

W: 192mm
D: 430mm
H: 540mm

CAADE004

\$155



ADE DELUXE AT/ATX MID CASE

W: 190mm
D: 425mm
H: 475mm

CAADE009

\$135



ADE DELUXE AT/ATX DESKTOP CASE

W: 442mm
D: 473mm
H: 155mm

CAADE012

\$135



ADE Generic Cases

Code	Model	Dimensions (W x D x H)	Price
CAADE000	ADE MINITOWER CASE	180mm x 415mm x 332mm	\$65
CAADE001	ADE DESKTOP CASE	147mm x 401mm x 491mm	\$69
CAADE002	ADE MIDTOWER CASE	180mm x 405mm x 78mm	\$95
CAADE003	ADE FULL TOWER CASE	192mm x 427mm x 580mm	\$135
CAADE005	ADE-SERVER FULL TOWER CASE 300W	192mm x 427mm x 580mm	\$225
CAADE011	ADE FULL TOWER ATX CASE	192mm x 427mm x 580mm	\$225

Miscellaneous Cases

Code	Model	Dimensions (W x D x H)	Price
CAADE007	Ext. 5.25" SCSI Case	216mm x 81mm x 63mm	\$155
CAADE008	Ext. 5.25" IDE CD-ROM Case	203mm x 256mm x 74mm	\$155
MSADE000	IDE Removable HDD Rack	147mm x 211mm x 42mm	\$35
MSADE001	SCSI Removable HDD Rack	147mm x 211mm x 42mm	\$39
DSADE024	EH-132, Portable 3.5" Hard Drive caddy which plugs straight into the parallel port of your computer.	40MB - 8.4GB limit.	\$165
DSADE025	EH-100, Portable 3.5" / 2.5" Hard Drive caddy which plugs straight into the parallel port of your computer.	40MB - 8.4GB limit.	\$145

*ALL Cases include Power Supplies

Power Supplies



Code	Model	Price
PSGEN000	200W POWER SUPPLY	\$45
PSGEN001	300W POWER SUPPLY	\$99



Code	Model	Price
PSGEN000	200W ATX POWER	\$55
PSGEN001	300W ATX POWER	\$99

UPS Power Supplies

Code	Model	Price
PSAPC000	APC BACK-UPS 500	\$295
PSAPC001	APC BACK-UPS PRO 420	\$450
PSAPC002	APC BACK-UPS PRO 650	\$530
PSAPC003	APC SMART-UPS 700	\$795

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CD WRITERS

CD RE-WRITERS

TRAXDATA CD Writers & Re-Writers

Traxdata products make it easy to record your own CD's with the very latest technology available. Providing a total solution to all **CD Recording needs** from a wide range of **hardware, software** and **blank media**, Traxdata has the winning edge!

Whether your needs are to record CDs for Data, Music, or Video [or all of them], we have the kit that is right for you. One of the most exciting advances in digital technology has been the development of Compact Discs and CD Recorders.

It is now easy and affordable to make your own high quality digital recordings of music, computer data, photo and video files from your desktop.

• Easy to use • Easy to install • Affordable • Make your own high quality CD's

new 1.2GB Data Storage Capacity for all recorder kits!!



CDRW2260 EL PLUS

2x record, 2x rewrite, 6x playback
IDE interface for easy connectivity

Internal Recorder with:

- CD Recording Software
- UDF Recording Software (Win '95)
- Internal Power & IDE Cables
- Label Design Templates
- Fixing Screws
- CD Marker Pen
- Manuals

MMTRA004 **\$655**



CDRW4260 EL PRO

4x record, 2x rewrite, 6x playback
SCSI interface for high volume, high speed data transfer

Internal Recorder with:

- CD Recording Software
- UDF Recording Software (Win '95)
- Internal Power & SCSI Cables
- Label Design Templates
- Fixing Screws
- CD Marker Pen
- Manuals

MMTRA005 **\$895**



CDR4120 EL PRO

4x record, 12x playback
The worlds fastest 4x record, 12x Playback drives

High speed CD-ROM read capability, with very fast access and low CPU utilisation supporting packet, disc at once and track at once recording modes

Internal Recorder with:

- CD Recording Software
- UDF Recording Software (Win '95)
- Internal Power & SCSI Cables
- Label Design Templates
- Fixing Screws
- CD Marker Pen
- Manuals

MMTRA002 **\$755**

BLANK CD-R

MMTRA007 **\$5**

BLANK CD-RW

MMTRA008 **\$45**



PCI SCSI CARD

This Plug 'n' Play High Performance Bus Mastering PCI SCSI Controller Kit

offers blisteringly fast data transfer rates of up to 20MB/sec, allowing large blocks of data to be handled with the minimum of CPU utilisation.

Includes:

- PCI bus mastering card
- 1xCDD
- Power & SCSI cable (int.)
- installation software

MMTRA006 **\$135**



CDE4120 EL PRO

Recorder in external case with:

- Power Supply
- CD Recording Software
- UDF Recording Software (Win '95)
- 2 CD-R Discs
- External Power Cable
- External SCSI to SCSI-2 Cable
- Label Design Templates
- Fixing Screws
- CD Marker Pen
- Manuals

MMTRA003 **\$855**

RICOH CD Writers

CD WRITERS

INPUT DEVICES

SCANNERS

A single drive that does it all. Reads, writes, Rewrites CD data.

The Ricoh MP6200 series drives have multi-function capabilities so they can efficiently handle any CD-based media from the world's first re-writeable CD, Ricoh's CD-RW, to the write-once CD-R and CD-Rom. With just one drive, you can always choose the perfect media to suit your applications.



MP6200AR (EIDE) ATAPI

MMRIC001

\$655

Internal EIDE CD-R/CD-RW Drive

Direct CD Ver. 2.0, Easy CD Creator 95/NT

1 CD-R Disc, 1 CD-RW Disc

Operation Manual, Audio Cable, Mounting Screws

MP6200SR (SCSI)

MMRIC000

\$735

Internal SCSI CD-R/CD-RW Drive

Direct CD Ver. 2.0, Easy CD Pro 95/NT

4 CD-R Disc, 1 CD-RW Disc

Operation Manual, Audio Cable, Mounting Screws

Ricoh CD-RW Disc 74 Mins 650Mb

MMRIC003

\$39

Ricoh CD-R Disc 74 Mins 650Mb

MMRIC004

\$4

**Fast writing and reading
6x read 2xwrite**

- CD-RW and CD-R writing
- Unlimited media selection

Input Devices / Scanners

Keyboards

GENERAL

Code	Model	Price
IOGEN000	ENHANCED 104/WIN95	\$30
IOGEN001	HONEYWELL GENUINE - 104/WIN95	\$45
IOGEN010	GENERIC PS/2 Keyboard	\$45

Mice

Code	Model	Price
IOGEN004	GENERIC 3 BUTTON MOUSE	\$10
IOMST003	MICROSOFT INTELLI-MOUSE	\$95
IOMST004	GENIUS 3 BUTTON MOUSE - SER./PS2	\$25

Scanners

Acerscan

Code	Model	Price
IOACE003	ACERSCAN 310 24 BIT-4800 DPI	\$235
IOACE004	ACERSCAN 610 PLUS 30 BIT-9600 DPI	\$395

Scanners

Hewlett Packard 5100 IOHPD001 **\$465**

- The HP ScanJet 5100 flat bed scanner is HP's Solution for scanning pictures, text and documents at the push of a button.
- 1200x1200 dpi enhanced, 300 dpi optical with 24-bit colour and 8-bit grayscale.
- Includes award winning Visioneer PaperPort V3.0 software that helps you quickly find, organise and add comments to scanned documents.

Code	Model	Price
IOHPD012	5100 with Adobe Photoshop 4.0	\$655
IOHPD013	5100 with Omnipage Pro	\$675

Hewlett Packard 6100C IOHPD011 **\$1235**

- Use the exclusive HP ScanJet Slide Adaptor to scan 35mm slides.
- 2400x2400 dpi enhanced, 600dpi optical with 30-bit colour and 10-bit grayscale.
- Includes DeskScan II scanning software, or from within software using TWAIN or OLE.

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Adelung Computers

MONITORS

CD-ROM DRIVES

KEYBOARDS

FLOPPY DISK DRIVES



**MITSUBISHI
ELECTRIC**

EXCELLENCE THROUGH INNOVATION

Monitors



**Mitsubishi
Diamond View 17"**

\$795 MOMIT002

- Advanced Plug & Play compatibility
- Superior image fidelity-0.27DP
- Freq H: 30-72 KHz, Freq V: 50-120Hz
- Maximum Resolution: 1280x1024 up to 60Hz



**Mitsubishi
Diamond Pro 21"**

\$2950 MOMIT000

- A new DIAMONDTRON Monitor, with the super-fine aperture grille pitch of 0.28mm
- Maximum Resolution 1280x1024



**Mitsubishi
Diamond View 15"**

\$399 MOMIT003

- Advanced Plug & Play
- Superior image fidelity 0.28DP
- Maximum Resolution 1024x768 up to 66Hz



**Mitsubishi
Diamond Pro 17"**

\$955 MOMIT001

- DIAMONDTRON Monitor, with the super-fine aperture grille pitch of 0.25mm
- Maximum Resolution 1280x1024 60Hz

Input

**Mitsubishi Diamond Touch
Ergonomic Keyboard**

IOMIT 001 **\$69**



**Mitsubishi Diamond Touch
Economical Keyboard**

IOMIT 000 **\$35**



Media

MMM00 000



MMM00 001

**Mitsubishi Diamond Data 24x
CD-ROM Drive (int.)**

- E-IDE/ATAPI interface
- 3600KB/sec maximum data transfer rate (24x max)
- 125ms typical access time

\$115

Diamond Data 32X CD-ROM

\$135

The new standard in diskette storage.

BUMIT 000

Mitsubishi LS - 120 - 120MB Capacity.

\$199

Mitsubishi LS-120 FACTS:

- Large storage capacity of 120MB in a single LS-120 diskette.
- 100% compatibility with existing 3.5" diskette media
- Supported by MS DOS, Windows (3X, 95, NT)
- 5 times faster than standard 1.44MB drives when using LOS-120 diskettes
- Bootable, can act as a Boot Drive when appropriate BIOS installed
- Internal Drive



BUMIT 001

**120MB capacity diskettes
to suit LS - 120 Drive**

\$25



FDMIT 000

Mitsubishi Diamond Data 1.44MB Floppy disk drive

\$39



Monitors

MONITORS

MODEMS

SONY

CPD-100SF Trinitron Graphics Display

- 15" Trinitron CRT with 13.9" viewable image size for excellent picture quality
- Windows 95, plug and play capable
- Digital Multiscan Technology to support multiple PC and Macintosh resolutions
- Recommended resolution of 1024 x 768 @ 85 Hz non-interlaced
- 368 x 373 x 384.5mm

MOSON000 **\$655**



**3yr
Warranty**

CPD-200ES Trinitron Graphics Display

- 17" Trinitron® CRT (16.0" viewable image)
- Super Fine Pitch™ 0.25mm Aperture Grille
- Digital Multiscan Technology supports multiple PC and Macintosh resolutions up to 1280 x 1240 @ 60Hz
- On-screen digital controls
- Macintosh® compatible, and International Energy Star compliant

MOSON003 **\$1195**

GDM-200PS Trinitron Graphics Display

- 17" Trinitron CRT (16.0" viewable image size) with Sony Elliptical Correction System™ technology
- Super Fine 0.25mm Aperture Grille Pitch
- Digital Multiscan Technology supports multiple PC and Mac resolutions up to 1600 x 1200 @ 70Hz
- Active Signal Correction™ (ASC) circuitry for automatic screen sizing and centring
- Advanced, on-screen digital controls
- Macintosh® Compatible, International Energy Star compliant, TCO 92, and MPR II approved

MOSON004 **\$1955**

new

CALL for INFORMATION on
19" GDM-400PS Trinitron Graphics Display
&
20" GDM-500PS Trinitron Graphics Display

VALUE Monitors

Code

MOGEN000

MOGEN001

Model

14" SVGA 0.28DP - 1024x768

15" XGA 0.28DP - 1024x768

Digital Controls, Non-Interlaced, Plug & Play.

Price

\$275

\$375

Modems



Code

FMNET007

FMNET006

FMNET012

FMNET013

FMNET008

Model

InModem 56K Internal Modem

Roadster 56K External Modem

Roadster 56K Ultra SVD External Modem

PCMCIA CardModem 56K

PCMCIA CardModem 56K + Ethernet

Price

\$195

\$255

\$275

\$395

\$505



FMROB006

FMROB007

Sportster Flash 56K External

Winmodem Voice 56K Internal

\$249

\$199



FMBAN003

Wave SP 56K SVD External

\$269

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FAX / MODEMS

TV TUNERS

NETWORKING

SPiRiT

MODEMS

Spirit 560SP External 56,000bps FMSP1007 **\$199**

Internet Voice fax/modem with Speakerphone + SVD external 56k high speed fax/modem that supports the Rockwell K56Flex standard and popular data & fax standards up to 33,600bps. Hardware based error correction & data compression. Includes Windows fax and communications software with voice mail system, plus Windows Internet software.

All Modems include:

- 9/25 serial cable (external models)
- Power supply and phone cord (all models)
- Installation instructions and documentation
- Software: Internet dialler & browser, data terminal emulation software, send receive fax application, professional voice mail system



336EL new Model

Now with SVD and Spk Ph.

Code	Description	Price
FMSP1006	Int. 56K,SVD, Spk Ph.	\$169
FMSP1000	336EL Ext. 33.6K ,SVD, Spk Ph.	\$129

TV TUNER

Spirit TV Video Card MMSP1000 **\$149**

Turn your PC into a TV. PCI card that brings full TV reception capabilities to your PC. Features full motion video and "still" capture. It will take video IN from another source (like a Camcorder), show it, play it, and save it on your PC. Requirements: Windows95 directx (add on) and a PCI bus master slot required.



new

PCMCIA

Spirit Ventura FMSP1005 **\$375**

The perfect notebook partner that's GSM Digital Mobile ready! Our best PCMCIA (PC-Card) product. 33,600bps data and 14,400bps fax capability.

Connection kits available for Nokia 8110 / 3810, 2110, Motorola and many more GSM mobile phones. **Call** for details.



Spirit PCMCIA Ethernet Adaptor NWSP1000 **\$149**

Connect your laptop to your Network using this high speed adaptor.

Compliant with 10BASE-T/2 specifications, NE2000 compatible and auto-configurable. Auto-detecting connector in use and "Hot-swap" insertion and removal. Shielded RJ-45 /BNC connectors. Driver support for major Network Operating systems.

NETWORKING

Spirit 5 Port Hub NWSP1003 **\$89**

Equipped with 6 LEDs for easy viewing and troubleshooting. Convenient sliding covers allows you to select either external DC power adaptor or IBM PS/2 compatible keyboard direct power cable. 5th port also doubles as an uplink port.



Spirit Network Cards NWSP1002 **\$49**

PCI network card has full duplex operation support. Automatic PCI configuration without jumpers. Has both RJ-45 and BNC connections.

ISA Plug n Play network card also available NWSP1001 **\$39**



LAN Pack - P'n'P - 10BaseT NWSP1004 **\$289**

Complete network starter kit includes 1 PCI & 3 ISA network adapters, a 5 port hub and 4 x 8Metre UTP cables. P'n'P, 10 Mbps components can operate in Full Duplex Mode to achieve 20Mbps throughput. Detailed step-by-step installation instructions, locally designed and written for the new user. Documentation covers; familiarisation, topology, planning, hardware installation and testing.

Printers & Consumables

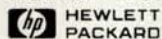
PRINTERS

INK & TONER

INKTEC CONSUMABLES

Canon

Code	Description	Printer compatibility	Price
INCAN000	BC01 BLACK	BJ10/20	\$45
INCAN001	BC02 BLACK	BJ200/BJ210/BJ240	\$45
INCAN002	BC05 COLOUR	BJ210/240	\$49
INCAN003	BC06 PHOTO COLOUR	BJ240	\$49
INCAN004	BC06 PHOTO COLOUR KIT	BJ240	\$65
INCAN005	BC09F FLURO COLOUR	BJ210/BJ240	\$79
INCAN006	BC10 BLACK & HEAD	BJ30/BJ70	\$55
INCAN007	BC1-10 BLACK	BJ30/70	\$25
INCAN008	BC11 COLOUR & HEAD	BJ70	\$65
INCAN009	BC1-11 BLACK (3 PK)	BJ70	\$25
INCAN010	BC1-11C COLOUR (3 PK)	BJ70	\$35
INCAN011	BC20 BLACK & HEAD	BJ4000 SERIES	\$49
INCAN012	BC21 COLOUR & BLACK	BJ4000 SERIES	\$79
INCAN013	BCI21 BLACK	BJ4000 SERIES	\$14
INCAN014	BCI21C TRI-COLOUR	BJ4000 SERIES	\$29
INCAN015	BC22 PHOTO	BJ4200/BJ4500	\$75
INCAN016	BC22 PHOTO KIT	BJ4200/BJ4500	\$95
INCAN017	BC29F FLURO COLOUR	BJ4000 SERIES	\$75
INCAN018	BJI201B BLACK	BJ600 SERIES	\$25
INCAN019	BJI201C CYAN	BJ600 SERIES	\$15.50
INCAN020	BJI201M MAGENTA	BJ600 SERIES	\$15.50
INCAN021	BJI201Y YELLOW	BJ600 SERIES	\$15.50
INCAN022	BJI642 BLACK	BJ300/330	\$29
INCAN023	BJI643 BLACK	BJ800/880	\$45
INCAN024	BJI643C CYAN	BJ800/880	\$49
INCAN025	BJI643M MAGENTA	BJ800/880	\$49
INCAN026	BJI643Y YELLOW	BJ800/880	\$49
INCAN027	BJI801 BLACK	BJ80	\$39
INCAN028	BC03 BLACK	BJ210SP	\$45
INCAN029	BC60 BLACK	BJC7000	\$59
INCAN030	BC61 COLOUR	BJC7000	\$69
INCAN031	BC62 PHOTO COLOUR	BJC7000	\$95



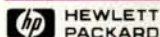
Code	Description	Printer compatibility	Price
INHDP000	HP51633M BLACK	HP PORTABLE	\$49
INHDP001	HP51626A BLACK	HP 500 SERIES	\$49
INHDP002	HP51629A BLACK	HP 600 SERIES	\$45
INHDP003	HP51645A BLACK	HP850C/1600	\$49
INHDP004	HP51640A BLACK	DJ 1200 SERIES	\$45
INHDP005	HP51606A BLACK	HP PAINTJET XL	\$55
INHDP006	HP51639A BLACK	PAINTJET XL300	\$39
INHDP007	HP51625A COLOUR	DJ500 SERIES	\$49
INHDP008	HP51649A COLOUR	HP 600 SERIES	\$49
INHDP009	HP51641A COLOUR	HP850C/890C	\$55
INHDP010	HP51640C CYAN	DJ1200/1600	\$49
INHDP011	HP51640M MAGENTA	DJ1200/1600	\$49
INHDP012	HP51640Y YELLOW	DJ1200/1600	\$49
INHDP013	HP COLOUR PHOTO KIT	HP690C	\$59
INHDP014	HP PHOTO CARTRIDGE	HP300/400/540	\$55



EPSON

Code	Description	Printer compatibility	Price
INEPS003	SO20025 BLACK	400/800/1000	\$35
INEPS004	SO20034 BLACK	COLOUR/PRO/PROXL	\$45
INEPS005	SO20036 COLOUR	COLOUR/PRO/PROXL	\$85
INEPS006	SO20047 BLACK	200/820/II/III	\$35
INEPS007	SO20049 COLOUR	II/III/820/1500	\$45
INEPS008	SO20062 BLACK	STYLUS 1500	\$65
INEPS009	SO20066 COLOUR	STYLUS PRO XL+	\$95
INEPS010	SO20089 COLOUR	400/600/800/1520	\$45
INEPS011	SO20093 BLACK	C400/500/600	\$35
INEPS012	SO20097 COLOUR	C500/200	\$49
INEPS013	SO20108 BLACK	C800/1520	\$45

Toner Cartridge



Code	Description	Printer compatibility	Price
TOHPD000	HP92295A	HP LASERJET II/III	\$125
TOHPD001	HP92274A	HP 4L/4ML/4P/4MP	\$115
TOHPD002	HP-C3906A	HP LASERJET 5L/6L	\$115
TOHPD003	HP92275A	HP IIP/IIIP/IIIP+	\$149
TOHPD004	HP92291A	HP 4SI/4SI MX/3SI	\$220
TOHPD005	HP-C3900A	HP 5SI/5SI MX	\$325
TOHPD006	HP92298Z	HP 4/4M/5/5N/5M	\$165
TOHPD007	HP-C3900A	HP 4V/4MV	\$275
TOHPD008	HP	HP 5P/5MP/6P/6MP	\$155

Printers

EPSON

Code	Model	Price
PREPS001	STYLUS COL. 400, 720X720 DPI, 3PPM, WIN COMP.	\$299
PREPS002	STYLUS COL. 600, 1440X720 DPI, 3PPM, WIN COMP.	\$399
PREPS003	STYLUS COL. 800, 1440X720 DPI, 7PPM	\$545
PREPS011	STYLUS PHOTO COLOUR 720X720	\$795
PREPS010	STYLUS COL. 1520 1440X720 DPI	\$1695
PREPS007	LQ-570+ 24PIN MATRIX	\$575



EPSON STYLUS™ 600

InkTec®

Compatible Cartridges & Refills

EPSON CARTRIDGES

INTEC000	400/600/800/1500/1520: Blk	\$19
INTEC001	400/600/800/1500/1520: Col	\$34
INTEC002	300/330	\$18
INTEC003	4000/41/42/4550 From	\$12 (photo avail.),
INTEC004	600/610/620 From	\$9



THIS MONTHS SPECIAL

YES CARTRIDGES!
WE ALSO SELL
Big Blk & 3 Col Refills

HP Range,	\$19 Blk	INTEC005
\$30 Col (photo avail.)		INTEC006
CANON	\$19 Blk	INTEC007
\$30 Col		INTEC008
Lexmark	\$19 Blk	INTEC009
\$30 Col		INTEC010
Photo Real BC-22 & 06 From	\$40	INTEC011
HP151649P DeskJet Photo	\$40	INTEC012

Photo Real BC-22 & 06 From **\$40**
HP151649P DeskJet Photo **\$40**

EPSON - CANON - HP - LEXMARK INK

Sales staff are available (est) 9am-6pm Monday to Friday, 10am-4pm Saturday
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Adelony Computers

BJC-80 PRCAN000 \$429

- Drop Modulation Technology - the dual drop size breakthrough that **produces smoother colour gradations.**
- Office laser quality finish and B&W speeds up to 5 pages per minute with dedicated black cartridge.
- Windows® 95 compatible IrDA infrared port for cable-less communications.
- Fits in half a briefcase, weighs only 1.4Kg!



• **Optional scanner head for colour graphics, OCR and faxing.**
\$155 PRCAN001

BJC-4200 PRCAN003 \$265

- Offers **speed and versatility at an unbeatable price.**
- Outstanding plain paper output, Photo Mode colour up to 720 dpi.
- Four ink options for any printing task; Standard colour, high speed black, PhotoRealism and Fluorescent ink.
- PhotoRealism printing for photographic reproduction with richer, more life-like colours.
- Fluorescent ink option



BJC-4300 PRCAN014 \$315

- **EVERYTHING THE BJC-4200 DOES & MORE!!**
- Exclusive Drop Modulation Technology.
- Photo-Realistic Colour.
- Canon Creative Software, Banner Printing.
- Prints at up to 5ppm
- Exclusive Colour Image Scanner Cartridge (optional), scans at 360dpi.



BJC-7000 PRCAN012 \$615

- 7-colour ink system and 9 saturation levels per pixel for **incredibly rich photographic half-tones.**
- Combined total of 1088 print nozzles firing up to 10,000 drops per second!
- P-POP (Plain Paper Optimised Printing) gives plain paper a coated paper quality finish.
- Documents printed with P-POP are 99.4% water fast!



new Canoscan FB310 IOCAN000 \$199

Canon's most space-saving solution to flatbed scanning!

- Excellent 30-bit input/24-bit output.
- Operates without noise.
- Produces outstanding full-colour scans at 300dpi.



BJC-210SP PRCAN002 \$165

- **Super Economy** mode for colour and B&W.
- Photo Mode printing for colour that rivals more expensive four-colour systems.
- Prints up to 2400 B&W pages and 600 colour pages.
- New high capacity black cartridge - 20% more ink, no extra cost.
- Up to 5 times the output of direct competitors.



LBP-660 PRCAN011 \$499

- **High speed**
- True Performance
- High Resolution
- Outstanding line definition
- Better graphics and photo handling
- More user friendly
- Outstanding economy



BJC-4550 PRCAN005 \$675

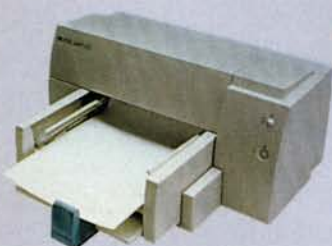
- Everything you could want in a desktop printer.
- A3 colour printing, **perfect for CAD, DTP and spreadsheet work.**
- Automatic switching for Windows® 3.11/95 and Macintosh®.
- Dedicated black ink cartridge for fast B&W printing.
- PhotoRealism option for photographic reproduction with richer, more life-like colours.
- Fluorescent ink option



BJC-5500 PRCAN013 \$1295

- **Outstanding Photo Mode** colour printing up to 720 dpi resolution on plain paper.
- Exceptionally fast B&W printing without the noise of impact printers.
- Tractor feed for full width computer paper built-in.
- Print A3 CAD drawings on plain, coated and glossy paper.
- Create A2 posters and displays on high gloss and back print film.





HP 670C PRHPD002 **\$249**

- 4ppm in black, 1.5 ppm in colour two cartridges, one black, one colour. So you can print in black and colour without switching cartridges
- HP Colour Smart and Real life Imaging System

HP 692C PRHPD021 **\$395**

- HP's **most versatile colour printer**. Prints on plain paper, card stock, stickers, labels, banners and even iron-on transfers.
- HP Photo Ret technology gives life like colour

HP 720 PRHPD031 **\$599**

- Looking for a business printer that gives you sharper, more realistic colour for everything you print?
- PhotoREt II delivers **smaller ink drops & more colour shades**
- The HP Deskjet 720C is designed for Microsoft® Windows® 3.1x, Windows 95 and Windows® NT 4.0



- operating systems and supports Intel's MMX technology for faster colour processing
- Prints fast - up to 8 pages per minute in black, 4 pages per minute in colour

HP 890C PRHPD025 **\$785**

- Up to **9ppm black**
- New Photo RET II
- Professional Photo Quality output
- Optional HP JetDirect for Network Connection



HP 1120 PRHPD032 **\$895**

- **600dpi C-REt & Colour Smart II**
- Print on various mediums from Post Card to A3 Paper
- 3 paper paths
- 6ppm black and 3.5ppm colour
- Optional HP JetDirect for Network Connection



HP 6L PRHPD009 **\$675**

- **Compact size**
- 600dpi RET
- Up to (6ppm) makes the HP 6L the ideal printer for the home or small office



HP OFFICEJET 635 PRHPD033 **\$999**

- All in one colour printer, 600x300DPI resolution
- Plain Paper **FAX**
- Fast **14.4K Modem**
- Digital **Copier**
- **Scanner** includes Omnipage Limited edition OCR Software
- Up to 5ppm black and 2ppm colour



HP OFFICEJET Pro 1150C PRHPD020 **\$1435**

- Everything you need to print, **copy and scan** professional quality colour and B&W
- Digitally enhances images it copies to produce cleaner copies with accurate colour



HP 6P PRHPD010 **\$1395**

- Up to 8ppm black
- 600dpi RET
- Two input sources including **250 sheet cassette tray**
- Network Connection with Jet Direct (opt.)



HP 6MP PRHPD011 **\$1575** (Postscript Version)

**Please Call for
HP Laserjet 4000 Series**

Sales staff are available (est) 9am-6pm Monday to Friday, 10am-4pm Saturday
Technical Support (5 Days a week 9am-6pm) Phone (02) 9700 9354



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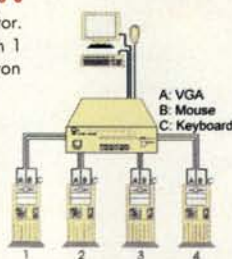
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Data Switches

CS-102/104/106

These CPU switches are useful for operating 2 to 6 computers from one keyboard, mouse and monitor. Ideal for administrators and those with more than 1 computer. Switching is done via an electronic button

Code	Model	Price
DSADE030	CS-102	\$245
DSADE019	CS-104	\$395
DSADE020	CS-106	\$399
CBGEN098	AT Cable Set	\$35
3 Cables Required; KeyBd./M/M, Mouse M/F & Monitor M/F		
CBGEN099	PS/2 Cable Set	\$39
3 Cables Required; KeyBd./M/M, Mouse M/M & Monitor 15M/15F		



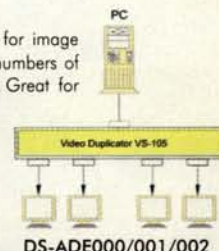
CS-104 for PS2 and AT
DS-ADE030/019/020

VS-102/104/108

These video splitters are the ideal solution for image duplication. Cascade ability allows infinite numbers of VGA monitors to display the same image. Great for presentations.

Code	Model	Price
DSADE000	VS-102	\$89
DSADE001	VS-104	\$135
DSADE002	VS-108	\$195

Cable Required; 15pin M/15pin M



DS-ADE000/001/002

CS-102



CS-104



CS-106



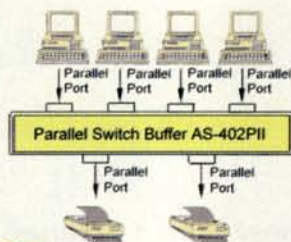
VS-104



AS-402/422

If you have one or two printers, but there are four computers needing to share them, the AS-402 is the right choice.

Code	Model	Price
DSADE010	AS-402/422	\$95

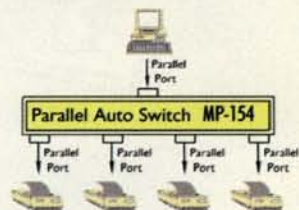


DS-ADE010

MP-154

Bi-directional data switch allows 4 users to share 1 printer or a single user to use 4 printers. MAX 6M.

Code	Model	Price
DSADE014	MP154	\$65

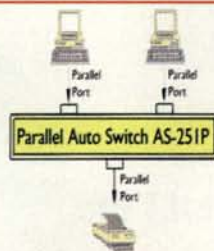


DSADE014

AS-251P/AS-451P

Non-powered 2/4 to 1 Parallel Auto switch for printers. MAX 6M.

Code	Model	Price
DSADE033	AS-251P	\$35
DSADE007	AS-451P/MP451	\$45

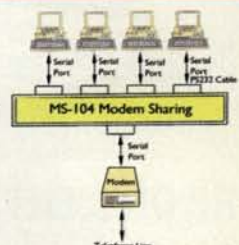


DS-ADE007/033

MS-104

Non-powered 4 to 1 modem-sharing device allows 4 users to share one modem using one phone line. Compatible with all modems at speeds of up to 56700 baud. MAX cable length of 15M.

Code	Model	Price
DSADE009	MS-104	\$145



DS-ADE009

Code	Description	Price
DSADE003	Serial/Parallel bi-directional converter. Allows parallel signals to travel over longer distances.	\$95
DSADE005	IC-162/4, Non powered parallel line extender. Transmitter and Receiver included.	\$65
DSADE007	AS-451P/MP451, 4 to 1 Printer Auto Switch	\$45
DSADE008	AS-811P, 8 to 1 Printer Auto Switch	\$125
DSADE009	MS-104, Non-powered 4 to 1 modem-sharing device.	\$145
DSADE010	AS-402/422, 4 Computer to 2 Printer Auto Switch	\$95
DSADE011	AS-411S, 4 Computers to share 1 serial printer auto switch with a maximum range of 15M.	\$95
DSADE012	AS-811S, 8 Computers to share 1 serial printer auto switch with a maximum range of 15M.	\$155
DSADE014	AS-154P, Bi-Directional 4 to 1 Printer Switch	\$65
DSADE015	AS-451S, Non-powered 4 to 1 Serial Auto switch, ideal for serial printers with a range of 15M.	\$45
DSADE016	SP-200, Non-powered serial to parallel converter	\$55
DSADE017	PS-200, Non-powered parallel to serial converter	\$55
DSADE018	IC-488P, IEEE488 To Centronics Converter	\$75

Code	Description	Price
DSADE023	MS-201N, 2 to 1 serial Auto switch.	\$25
DSADE024	EH-132, Portable 3.5" Hard Drive caddy which plugs straight into the parallel port of your computer. 40MB - 8.4GB limit.	\$165
DSADE025	EH-100, Portable 3.5" / 2.5" Hard Drive caddy which plugs straight into the parallel port of your computer. 40MB - 8.4GB limit.	\$145
DSADE026	2 to 1 Manual Printer Switch.	\$25
DSADE027	4 to 1 Manual Printer Switch.	\$35
DSADE028	2 to 1 Manual CPU Switch.	\$29
DSADE029	4 to 1 Manual CPU Switch.	\$39
DSADE032	AS-251S, Non-powered 2 to 1 Serial Auto switch, ideal for serial printers with a range of 15M.	\$35
DSADE033	AS-251P/MP201, 2 to 1 Parallel Auto Switch	\$35
DSADE035	IC-150, Transfer data at distances of up to 10KM at 110bps or 800M at 19200bps. Can use either a 4 wire full duplex cable or 2 wire simplex cable.	\$55

DFE-500TX PCI-bus 10/100M fast Ethernet network interface card

Intelligent Ethernet/Fast Ethernet adaptor, Auto negotiating 10Base-T/100Base-TX (Nway), Plug and Play support, low CPU utilisation, 32 bit high performance bus master, Optional remote boot rom, Certified driver for Netware, SCO Unix, Windows 95 and Windows NT

NWDLI002 **\$85**



DE-905/N Ethernet Network Kit (included 5-port Ethernet Hub & 2 ISA-bus Ethernet card)

Network kit for SOHO user, Easy to install, includes two Cat-5, 20 feet cables and AC power adaptor for hub, simple plug-and-play installation, D-link hubby received CeBit 95 Highlight Award. NWDLI006 **\$195**



DE-660CT PC Card Ethernet network interface card with RJ-45/BNC connectors, JTI function supported

Combo PCMCIA card with RJ-45 & BNC connectors, Full plug and play, Autodetection of cable type, Supports full duplex, Netware, SCO Unix, Windows 95 and Windows NT compatible, Support D-link just-in-time-interrupt (JTI) technology, 30% faster than other standard PCMCIA card.

NWDLI003 **\$125**



DES-1008/N 8-port Ethernet/Fast Ethernet Switch with 8x N-Way UTP ports

8 port UTP Auto negotiating 10/100Mbit switch (N-Way), Supports UTP/STP cables, MDI-II port, Support full/half duplex, Provides cut-through and fast store & forward switching, Auto polarity correction, Dynamic buffer allocation for network load balancing, Desktop size. NWDLI008 **\$1695**



Lifetime Warranty on all adapters and 10Mb hubs

Code	Model	Description	Price
NWDLI000	DE-220PCT	ISA Bus PnP Ethernet Adaptor with RJ-45/BNC Connectors	\$35
NWDLI001	DE-528CT	PCI-bus Ethernet adaptor with RJ-45/BNC connectors	\$50
NWDLI004	DE-809TC/N	8-port 10Base-T Ethernet Unmanaged Hub with BNC support	\$165
NWDLI005	DE-816TP/N	16-port 10Base-T Ethernet Unmanaged Hub with 1 AUI & 1 BNC ports (Rack-mount)	\$365
NWDLI007	DE-1824/N	24-port 10Base-T Ethernet Stackable Manageable Hub	\$995
NWDLI009	DE-855/N	Ethernet BNC-to-RJ-45 Media Converter	\$199
NWDLI011	DES-810	8-port Switch hub, 8x10 BASE-T, 2x100 NWay ports, UTP/STP supported	\$795

Networking

PLEASE CALL FOR ALL NETWORKING CABLES

3Com

Fast Ethernet

10/100BASE-T Network Interface Cards
High-performance, reliable networking at 10 or 100 Mbps with parallel tasking technology.

Code	Model	Price
NW3C0005	3COM FAST ETHERLINK XL PCI 10/100BT	\$195

EtherLink XL and EtherLink III

10 Mbps Network Interface Cards The #1 best-selling Ethernet NICs, providing unmatched performance, reliability, and network functionality.

Code	Model	Price
NW3C0000	ETHERLINK III ISA TP (RJ-45)	\$155
NW3C0001	ETHERLINK III ISA COMBO	\$199
NW3C0002	ETHERLINK III ISA 3C509B-TPC	\$159
NW3C0003	ETHERLINK XL PCI TP	\$215
NW3C0004	ETHERLINK XL PCI COMBO	\$235

PCMCIA Cards

Code	Model	Price
NW3C0007	ETHERLINK III PCMCIA TP	\$275
NW3C0008	ETHERLINK III PCMCIA COMBO	\$335
NW3C0016	ETHERLINK III PCMCIA 10/100	\$315

Intel

EtherExpress PRO Ethernet Cards. These adapters take full advantage of available bandwidth with its 32-bit bus-master architecture.

Code	Model	Price
NWGEN010	EtherExpress Pro PCI 10/100TX (RJ-45)	\$175
NWGEN013	EtherExpress Pro PCI COMBO	\$179
NWGEN009	EtherExpress Pro PCI 10PT	\$125
NWGEN014	EtherExpress Pro ISA COMBO	\$199

Generic

Code	Model	Price
NWGEN000	ISA Ethernet Card (COMBO)	\$35
NWGEN001	PCI Ethernet Card (COMBO)	\$40
NWGEN002	5 PORT HUB with up-link port	\$85
NWGEN003	8 PORT HUB with up-link port	\$115
NWGEN004	16 PORT HUB with up-link port	\$245
NWGEN005	PCMCIA Ethernet Combo	\$175
NWGEN011	Ethernet Transceiver AUI to RJ-45	\$65
NWGEN012	Ethernet Transceiver AUI to BNC	\$65



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CABLES

ADAPTERS

Cables & Adapters



Centronics 50



Honda 68



Honda 50



PS/2



RJ 45



BNC



serial mouse



DB 25

Item Code Description Price

PRINTER CABLES

CB-GEN000	6FT PRINTER CABLE	\$5.00
CB-GEN001	3 METERS PRINTER CABLE	\$9.00
CB-GEN002	5 METERS PRINTER CABLE	\$12.00
CB-GEN003	10 METERS PRINTER CABLE	\$19.00
CB-GEN004	20 METERS PRINTER CABLE	\$25.00
CB-GEN088	1.8M IEEE1284 PRINTER CABLE	\$19.00
CB-GEN089	1.8M IEEE1284 PRINTER CABLE	\$20.00

DB25 CABLES

CB-GEN008	1.8M SERIAL DB25M/DB25M	\$9.00
CB-GEN009	3M SERIAL DB25M/DB25M	\$15.00
CB-GEN010	5M SERIAL DB25M/DB25M	\$17.00
CB-GEN011	10M SERIAL DB25M/DB25M	\$20.00
CB-GEN012	20M SERIAL DB25M/DB25M	\$25.00
CB-GEN013	1.8M SERIAL DB25M/DB25F	\$9.00
CB-GEN014	3M SERIAL DB25M/DB25F	\$12.00
CB-GEN015	5M SERIAL DB25M/DB25F	\$15.00
CB-GEN016	10M SERIAL DB25M/DB25F	\$17.00
CB-GEN017	20M SERIAL DB25M/DB25F	\$25.00
CB-GEN018	1.8M DB25F/DB25F	\$9.00
CB-GEN019	3M SERIAL DB25F/DB25F	\$12.00
CB-GEN020	5M SERIAL DB25F/DB25F	\$17.00
CB-GEN021	10M SERIAL DB25F/DB25F	\$20.00
CB-GEN022	20M SERIAL DB25F/DB25F	\$25.00

KEYBOARD & VGA CABLES

CB-GEN023	1.8M KEYBOARD EXT M/F	\$9.00
CB-GEN024	3M KEYBOARD EXT M/F	\$12.00
CB-GEN025	5M KEYBOARD EXT M/F	\$15.00
CB-GEN026	1.8M CURLY KB EXT M/F	\$10.00
CB-GEN027	1.8M PS/2 KB EXT M/F	\$12.00
CB-GEN028	1.8M PS/2 KEYBOARD M/M	\$12.00
CB-GEN029	1.8M KEYBOARD CABLE M/M	\$10.00
CB-GEN030	1.8M EGA/MOUSE EXT 9F/9M	\$9.00
CB-GEN031	1.8M EGA/MOUSE 9M/9M	\$9.00
CB-GEN032	1.8M VGA EXT 15M/15F	\$9.00
CB-GEN036	MONITOR SPLITTER 15M/15F*2	\$15.00
CB-GEN037	1.8M RGB CABLE 15M/BNC*5	\$25.00
CB-GEN082	5M VGA CABLE HD15M/HD15M	\$9.00
CB-GEN090	2M VGA TO EGA CABLE 9M/15M	\$9.00

SCSI PRODUCTS

CB-GEN042	1M CENT50M TO CENT50M SCSI	\$15.00
CB-GEN043	1.8M CENT 50M CENT 50M SCSI	\$17.00
CB-GEN044	1M CENT 50M/DB25M SCSI	\$15.00
CB-GEN045	CENT 50M SCSI TERM ACTIVE	\$25.00
CB-GEN046	CENT 50M TERM/C50M/C50F	\$19.00
CB-GEN047	1M HONDA 50M/CENT 50M	\$25.00
CB-GEN048	1.8M HONDA50M/CENT50M	\$29.00
CB-GEN049	1M HONDA 50M/DB25 SCSI II	\$25.00
CB-GEN050	1M HONDA 50M/HONDA 50M	\$39.00
CB-GEN051	1M HONDA 68M/HONDA 68M	\$45.00
CB-GEN052	1M HONDA 68M/HON 50M	\$45.00
CB-GEN053	1M HONDA 68M/CENT 50M	\$45.00
CB-GEN054	HONDA 50M TERMINATOR ACT	\$25.00
CB-GEN055	HONDA 68M TERMINATOR ACT	\$39.00
CB-GEN056	INTERNAL TERMINATOR ACT	\$20.00
CB-GEN057	INTERNAL SCSI III	\$85.00
CB-GEN060	INT SCSI CABLE 7 CONNECT	\$15.00
CB-GEN083	HONDA 68 TO DB25 M SCSI III	\$45.00

NETWORKING

CB-GEN064	2M COAXIAL CABLE WITH BNC	\$9.00
CB-GEN065	5M COAXIAL CABLE WITH BNC	\$12.00
CB-GEN066	10M COAXIAL CABLE WITH BNC	\$15.00
CB-GEN067	20M COAXIAL CABLE WITH BNC	\$20.00

Item Code Description Price

CB-GEN068	30M COAXIAL CABLE WITH BNC	\$25.00
CB-GEN069	50M COAXIAL CABLE WITH BNC	\$35.00
CB-GEN070	BNC TERMINATOR	\$3.50
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CB-GEN095	8M COAXIAL CABLE WITH BNC	\$15.00
CB-GEN096	12 METERS COAXIAL CABLE BNC	\$18.00
CB-GEN097	18 METERS COAXIAL CABLE BNC	\$25.00

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CBGEN103	GENDER CHANGER DB25F/F	\$9.00
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CBGEN105	DB25F/DE9M ADAPTOR	\$9.00
CBGEN106	MIN DIN 6M/DE9M	\$9.00
CBGEN107	MIN DIN 6F/DE9F	\$9.00
CBGEN108	MIN DIN 6M/DE9F	\$9.00
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CBGEN110	DE9M/HD15F ADAPTOR	\$9.00
CBGEN111	DE9M/HD15M ADAPTOR	\$9.00
CBGEN112	HD15M/HD15M ADAPTOR	\$12.00
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CBGEN123	DB25/DE9F ADAPTOR	\$9.00

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CBGEN006	1.8M 9F/25M MODEM CABLE	\$10.00
CBGEN007	1.6M 9F/25M/25F MODEM	\$15.00
CBGEN038	1.8M PARA LAPLINK DB25M/M	\$12.00
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CBGEN040	10M LAPLINK PAR DB25M/M	\$19.00
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Business Planning

SOFTWARE

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MAUS Business & Marketing Plans - The Easy Way!

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SWOT Analysis
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Its in-depth analysis of your company, products, competition and industry will enable you to capitalise on opportunities and prepare for potential threats in the marketplace.

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Your Computer Magazine

"The brilliance of this system is that you're led through the entire process step by step... the results will be as good as anything a professional would have provided for you"

Key Benefits

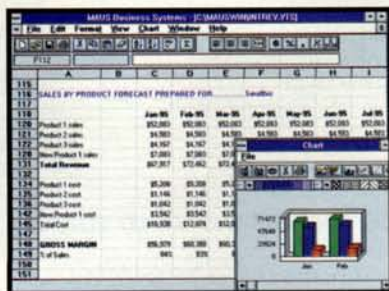
- Creates complete Business & Marketing Plans
- Suitable for business people of all levels
- Creates full financials & graphs
- Includes a simple step-by-step tutorial

Key Uses

- To Raise finance
- Increase profits
- Manage expansion
- Start a new business
- Impress your boss



Win95 and 3.1 compatible



Product Summary

- MAUS MasterPlan - **Level 1** (Standard): Software to help you prepare a simple Business Plan only and a full set of accompanying financials. **\$119** SWMAU000
- MAUS MasterPlan - **Level 2** (Professional): Software to help you prepare either a simple Business Plan or a more detailed Business Plan which incorporates a full Marketing Plan and analysis. Includes actual v. budgeted comparisons, action management program and FREE Workbook. **\$189** SWMAU001

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- Microsoft Outlook 97
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Whether you're writing a school report, updating an address list, cruising the Web, or balancing your budget, Home Essentials 98 has the latest, full versions of the programs you need to do your home-PC work:

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- Microsoft Encarta® 98
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SWMST001	Windows 95 Upgrade CD	\$139
SWMST002	Windows 95 Upgrade 3.5"	\$139
SWMST003	Windows NT Workstation 4.0 - New user	\$429
SWMST004	Windows NT Workstation 4.0 - Upgrade	\$195
SWMST048	Windows NT Server 4.0 + 5 user	\$990
SWMST067	Microsoft Publisher 98	\$155
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SWMST044	Microsoft Project 98	\$695
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SWMST062	Microsoft Encarta 98	\$75

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Code	Description	Price
SWMST025	Visual Basic V5.0 Std Learning CD	\$129
SWMST063	Visual Basic V5.0 Pro	\$695
SWMST064	Visual Basic V5.0 Pro - Upgrade	\$335
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Help your small business save time and money. Get your documents out faster and your money in quicker-fax right from your favourite Windows programs. Send contracts, bids, invoices and more in seconds. And save on phone charges by scheduling faxes for off-peak hours.

WinFax PRO is easy to install and use, step-by-step wizards show you exactly what to do.

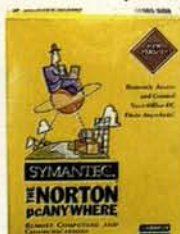


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Automatically fixes and prevents:

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- Software conflicts
- Windows problems
- Hardware problems
- Data loss

Price	Code	Description
SWSYM007		Norton Anti-virus 4.0 Gold Edition \$89



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SOFTWARE

Adobe

Professional image editing, drawing and page layout software that has become industry standard.

Code	Description	Price
SWADD002	Adobe Illustrator 7.0	\$699
SWADD000	Adobe Pagemaker 6.5	\$965
SWADD003	Adobe Photoshop 4.0	\$969

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Code	Description	Price
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MYOB

Code	Description	Price
SWMY000	FirstAccounts	\$175
SWMY001	Accounting	\$345
SWMY002	Accounting with Payroll	\$485
SWMY003	Premier Accounting	\$885
SWMY004	Asset Manager	\$275

Others

Code	Description	Price
SWGEM001	LINUX 6 CD set	\$39
SWGEM002	LINUX - Official Redhat	\$75
SWMFE000	MCAFFEE Virus Scan	\$69
SWMFE002	MCAFFEE Webscan	\$58
SWOZE000	OZEMAIL Internet Family Kit	\$29.95
SWOZE001	OZEMAIL Internet Starter Kit	\$9.95



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SWSOH001	125 Employer Letters and Agreements	\$29.95
SWSOH002	125 Legal Letters and Agreements	\$29.95
SWSOH003	125 Marketing Letters	\$29.95
SWSOH004	Business Planner	\$149.95
SWSOH005	Business Writer	\$59.95
SWSOH006	Marketing and Sales Planner	\$99.95

Specials

MAINBOARDS

MBSUP003	SuperMicro SNE II Pentium II with FX chipset, 6x72 pin simm, baby AT form 5 pci 4 isa slots, AMI Bios, PS2 mouse, overheat control	\$275
MBGIG006	Gigabyte GA 586SVX Pentium Vx chipset, creative vibra 16 on board, ATX form, 4x72 pin simm 1x168 pin dimm, 4 PCI 4 ISA	\$125
MBDTK004	DTK PRM-00741 P II FX chipset, ATX form, 8x72 pin simm slots, 5 PCI 3 ISA slots	\$175
MBDTK000	DTK PRM-0031i Pentium Pro FX Chipset, AT Form, 6x72 pin simm, 5 PCI 3 ISA slots	\$175
MBADE001	Pentium motherboard (FX, HX, VX)	\$45

ADE Vantage Value PC

Cyrix M2-200 Processor with MMX
16MB EDO RAM
2.1Gb Hard Drive
24 Speed CD-ROM Drive
16-Bit Sound Card
Amplified Speakers
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SYADE001



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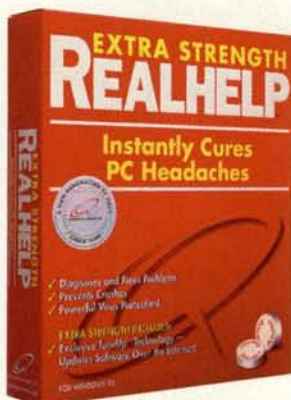


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- Continuous crash protection prevents loss of work and reduces downtime
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- Continuously monitors your system and stops conflicts before they occur
- The one-stop troubleshooter that works over the Internet to keep your PC running smoothly and at peak performance

Code	Product	Cost
SWQUA000	RealHelp Extra Strength	\$99.95
SWQUA001	Clean Sweep Extra Strength	\$89.95
SWQUA002	Partition It Extra Strength	\$99.95
SWQUA003	Virus Sweep Extra Strength	\$69.95
SWQUA004	Disk Clone	\$75.00
SWQUA005	Procomm Connections	\$169.00
SWQUA006	Remove-It 98	\$49.00

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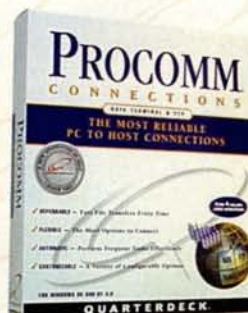
VIRUSWEEP Extra Strength
KILLS VIRUSES BEFORE THEY DAMAGE YOUR PC
Stops Viruses from Invading Files
Blocks Destructive Virus Activities
Keeps Your Data Safe
***EXTRA STRENGTH INCLUDES: Protects Against New Internet Threats Called Vandals**
• For Windows 95

CLEANSWEEP Extra Strength
THE #1 CHOICE FOR SAFE AND COMPLETE HARD DRIVE CLEAN-UP
Complete- Thoroughly Removes Old Programs
Safe- Exclusive Automatic Safety Features
Fast- The Fastest Uninstaller... Guaranteed!
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THE EASIEST WAY TO GET THE GARBAGE OFF YOUR HARD DRIVE!
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It's Automatic
It's Safe
It's Easy Internet Cleanup!
• For Windows 95/98 and 3.1 Versions Included!

PROCOMM Connections
THE MOST RELIABLE PC TO HOST CONNECTIONS
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Automatic- Perform Frequent Tasks Effortlessly
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THE SAFE AND EASY WAY TO COPY YOUR HARD DRIVE
Safe- No Data Loss While Copying
Easy- The Most Hassle-Free Way To Copy
Fast- Fastest Way To Upgrade Your Hard Drive
Flexible- Supports Large Hard Drive
• For Windows 98, 95, 3.1 NT, OS/2, Netware, UNIX and DOS



100% "In the Wild"
Virus Detection
Automatic Virus Protection
For All Platforms



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SWCYB002



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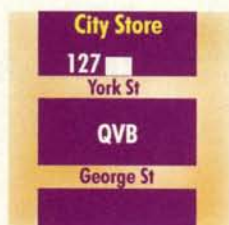
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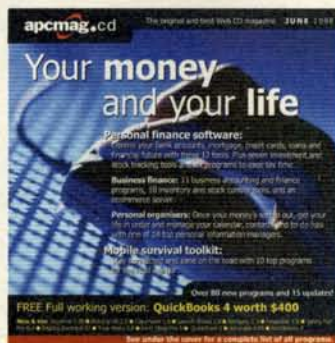
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- To provide fast, easy access to the files and resources we talk about in *APC* and to save you download time and money;
- To make it easy for our readers to get on the Internet so they can use our new interactive Web site.

The kit contains browsers, file-transfer programs, Mail and News readers and much more for each of the major operating systems. To make it as easy as possible for readers to get online, we've also included reader offers and a sign-up kit.

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You should carefully read the licensing agreements and honour any evaluation or shareware terms specified, read all instructions and Readme files, and virus-check every program before use. We check the CD with the latest available tools each month, but new viruses appear every week.

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Instructions on 'How to Enter' form part of the Conditions of Entry of all competitions in *APC* June. Entry is free and open to all residents of Australia other than employees of ACP Publishing Pty Ltd (ACN 053 273 546), suppliers of competition prizes, their families and associated agencies.

The contests close last mail June 18. Enter according to the instructions supplied with the individual competition. The contest will be judged by a panel appointed by ACP Publishing Pty Ltd on June 18, 1998. The judges' decision in relation to any aspect of the competition is final and binding on every person who enters. No correspondence will be entered into. Chance plays no part in determining the winner. No responsibility is accepted for late, lost or misdirected entries. All entries become the property of ACP Publishing Pty Limited, the promoter, 54 Park Street, Sydney, NSW 1028.

The prizes are not transferable or redeemable for cash. Any change in the value of the prizes occurring between the publishing date and the date the prizes are claimed is not the responsibility of the promoter.

Winners will be notified by security post and their names published in the August issue of *APC*.

Contacting APC

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Fax: (02) 9264 6320
Email: apc@acp.com.au

Melbourne Office:
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South Yarra Vic 3141
Phone: (03) 9823 6333
Fax: (03) 9820 1134
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Internet: apc@acp.com.au

Reader inquiries/back issues

Contact: Kim Edwards
Phone: (02) 9288 9123
Email: kedwards@acp.com.au
Contact for article archives, information regarding topic coverage, and back issue orders. Copies of old issues of *APC* are available at most local libraries, or from APC, Attn: Kim Edwards, PO Box 37, Sydney NSW 1028.

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Email: workshop@acp.com.au

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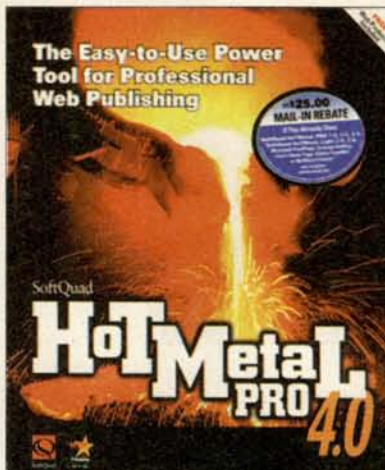
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These do-it-yourself books will have you troubleshooting, repairing and upgrading your PC in no time.

Upgrading and repairing PCs

Troubleshooting & Repairing PCs — Beyond the Basics

There's an undeniable joy in being able to pull off your PC's cover and tinker with the myriad cables and cards hidden beneath. It's even more enjoyable if you actually know what you are doing.

Written with the amateur 'PC fixer' in mind, *Troubleshooting & Repairing PCs — Beyond the Basics* explains in detail the architecture and history behind every whizz-bang piece of technology — from CMOS and caches to memory modules and motherboards — found inside IBM-compatible machines, as far back as the humble XT.

The title makes quite obvious the fact that this book isn't for beginners who wouldn't know RAM from ROM and, despite a ridiculously condescending explanation of monitors and keyboards, the text assumes at least a rudimentary understanding of a typical PC's innards. The content is thorough and there is no shortage of invaluable photographs, maps, grids and tables, highlighting little known or rarely seen facts and figures.

Hordeski's knowledge and decades of experience with a wide range of PC components shines through and he has targeted his audience precisely by peppering the book with invaluable hints, tricks and little-known facts amid insightful discussions about how and why various components work.

While Hordeski covers every possible component inside the PC, he devotes several chapters to commonly used peripherals such as printers, modems, LAN adapters and various flavours of printed circuit board. His discussions begin with several detailed chapters on the architecture of pre-Pentium machines, but the book was written around the time Intel's P150MHz was rumoured, so details of Pen-

tium II machines, MMX or the latest motherboard configurations naturally aren't included.

Samantha Amjadali

■ Author	Michael F Hordeski
■ Publisher	TAB Electronics Technician Library
■ Distributor	McGraw-Hill
■ Phone	(02) 9415 9888
■ Price	\$49.95
■ ISBN	0-07-030556-0
■ Rating	★★★★

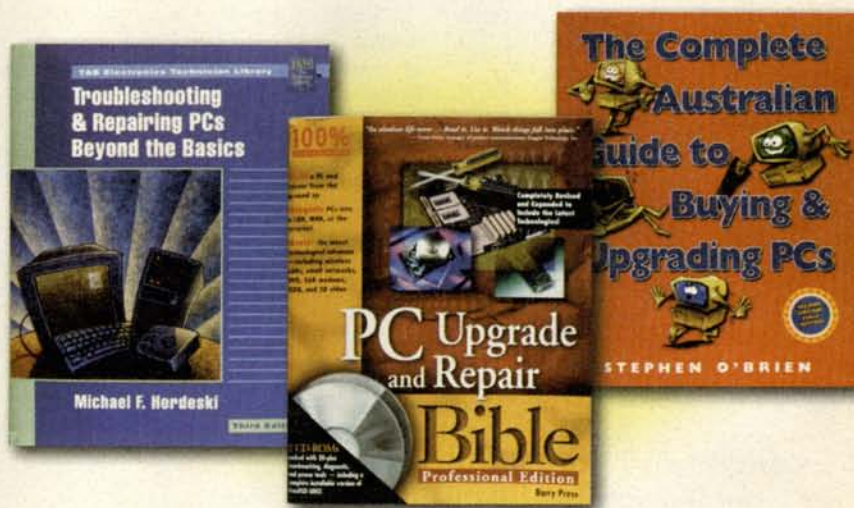
PC Upgrade and Repair Bible, Professional Edition

This book dedicates more attention to upgrading and configuring new systems than to repairs, and includes step-by-step case studies of building a desktop PC and a server and installing appropriate system software. The assertion that this book is for IT professionals could be justified by the 150-page section on networking, which includes information on setting up routers and using DMI and SNMP to manage networked systems — although in my experi-

ence most organisations prefer to buy complete computers rather than roll their own. Building servers is perhaps less unusual.

Useful background material helps readers understand where a particular system's bottlenecks occur and their relevance to certain applications. A good overview of hardware components covers cases to caches, and motherboards to modems. Press doesn't just tell you to look for feature X rather than Y; he explains why it is important. If you don't want that type of information, you're wasting much of this book.

I would have preferred to see more on repairing PCs. Writing "Every failure is different in some way, so it is not my intent to define a cookbook troubleshooting



Guide to ratings

★	Waste of space
★★	A pretty average place
★★★	Definitely in the race
★★★★	Can proudly show its face
★★★★★	Truly sets the pace

sequence here" seems a cop-out. However, there is plenty of useful material, including instructions for avoiding static damage, discussions on minimum versus realistic hardware requirements and benchmarking, and step-by-step guides to tasks such as replacing a motherboard.

One of the CD-ROMs that accompanies the book contains FreeBSD Unix; the other a collection of utilities, applications and other resources related to the text, including an electronic version of the extensive glossary and vendor listing.

Have a careful look inside this one before you buy. The content is good, but the coverage might not be what you would expect from the title.

Stephen Withers

■ **Author** Barry Press
 ■ **Publisher** IDG Books
 ■ **Distributor** Woodslane
 ■ **Phone** (02) 9970 5111
 ■ **Price** \$99.95
 ■ **ISBN** 0-7645-3148-4
 ■ **Rating** ★★☆☆

The Complete Australian Guide to Buying and Upgrading PCs

There is an old saying that free advice is worth exactly what you paid for it — nothing, and that is certainly true of advice about buying or upgrading PCs. Fortunately, the advice in *The Complete Australian Guide to Buying and Upgrading PCs* is worth many times its purchase price. The first 60 pages provide a no-nonsense, practical summary of what to look for and what to avoid when choosing a new PC.

The book is broken into easily digestible sections covering each device necessary for a current PC configuration, including processors, hard drives, monitors, CD and DVD devices, and lots more. Useful tables detail both the minimum and preferred configurations. My only criticism is that the section on scanners, digital cameras and optical character recognition was a little brief considering the amount of interest that these devices are attracting.

All explanations are comprehensive yet concise, with the minimum amount of technobabble. Each chapter contains a sprinkling of helpful 'Cool Tips, Jargon Busters, and Just for your Information' sections.

O'Brien caters for budget-conscious readers, with advice on which features are mandatory and which can be compromised in order to maximise available funds. *The Complete Australian Guide to Buying and Upgrading PCs* will appeal to anyone considering buying or upgrading a PC regardless of whether they are a complete novice or an informed buyer looking for a second opinion.

Mario Tutone

■ **Author** Stephen O'Brien
 ■ **Publisher** Prentice Hall
 ■ **Distributor** McGills Bookstore
 ■ **Phone** (03) 9602 5566
 ■ **Price** \$39.95
 ■ **ISBN** 0-7248-0281-9
 ■ **Rating** ★★★★★

In short

The Complete PC Upgrade & Maintenance Guide

A 1,520-page book that discusses the latest PC hardware, and has instructions on how to use the Internet to upgrade PCs and peripherals. It also features chapters on upgrading and protecting notebook computers and laser printers.

■ **Author** Mark Minasi
 ■ **Publisher** Sybex
 ■ **Distributor** McGills Bookstore
 ■ **Phone** (03) 9602 5566
 ■ **Price** \$109.95
 ■ **ISBN** 0782121519

PC Upgrading & Maintenance: No Experience Required

This reference uses step-by-step instructions, diagrams, and jargon-free discussions to show computer users how to perform the most valuable upgrades and troubleshoot common problems.

■ **Author** Peed
 ■ **Publisher** Sybex
 ■ **Distributor** McGills Bookstore

■ **Phone** (03) 9602 5566
 ■ **Price** \$49.95
 ■ **ISBN** 0-7821-21373

Hand-Me-Down PC: Upgrading and Repairing Personal Computers

Hand-Me-Down PC contains information about PCs in simple language; easy directions for 25 do-it-yourself upgrades; and the top 10 fixes for boot failures.

■ **Author** Morris Rosenthal
 ■ **Publisher** McGraw Hill
 ■ **Distributor** McGills Bookstore
 ■ **Phone** (03) 9602 5566
 ■ **Price** \$44.95
 ■ **ISBN** 0-07-053523-X

Upgrading & Fixing Networks for Dummies

This newly revised guide helps readers install hardware and fix nagging problems with clear, easy-to-follow instructions and figures. It contains advice on installing inexpensive new memory chips for faster performance and installing a CPU upgrade chip.

■ **Author** Anthony Rathbone
 ■ **Publisher** IDG Books Worldwide
 ■ **Distributor** Woodslane
 ■ **Phone** (02) 9970 5111
 ■ **Price** \$39.95
 ■ **ISBN** 0-7645-0129-1

Bigelow's Computer Repair Toolkit

This title provides access to over 100 free-ware and shareware programs on CD-ROM, and explains why, when and how to use them. The toolkit will enhance your ability to test the motherboard, chipsets and support circuitry; pinpoint problems with ports, controller cards and video adapters; clean and align floppy drives; monitor CD-ROM and hard drive performance; detect and remove any computer viruses; and finetune systems for optimum performance.

■ **Author** Stephen Bigelow
 ■ **Publisher** McGraw Hill
 ■ **Distributor** McGraw-Hill Book Company
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 ■ **Phone** (02) 9415 9888
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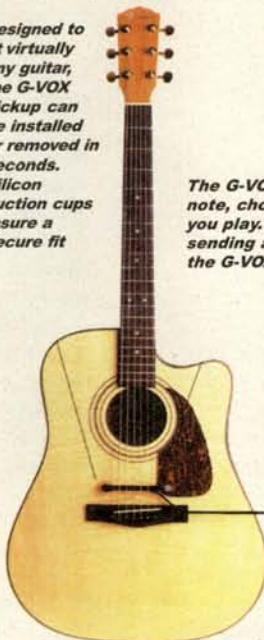
Nail down guitar fundamentals with software titles like, Riffs, Chords and Tour. Or you can compose, edit and print out your music with the G-VOX Bridge software. (It lets you link your guitar to top sequencing and/or notation software. So you can go direct to MIDI without a Keyboard in the way.)

Then there's the G-VOX Library series which puts you and your guitar side by side with guitar virtuosos. So you can watch, listen and follow along - note by note, fret by fret, finger by finger. At your own pace. (Imagine a private session with your favourite guitarist.) All in all, G-VOX lets you accomplish any number of things, depending on the software you choose.

And G-VOX is made to work with your guitar. Whether electric or steel string acoustic. Of course you'll need a MAC or PC to make every thing work, but you'll find G-VOX easy to use. And thoughtfully designed by guitarists for guitarists.

So play with it. Once you do you won't be able to put it down. And just imagine what that will do for your chops.

Designed to fit virtually any guitar, the G-VOX pickup can be installed or removed in seconds. Silicon suction cups insure a secure fit



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The G-VOX Pickup "hears" every note, chord, riff, bend and slide you play. While simultaneously sending all this information to the G-VOX Belt Pack.

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Select G-VOX software features on-demand video that lets you watch the action live. So it's even easier to follow and play along.



G-VOX lets you customize your system so it accurately tracks your individual playing style. It also lets you tune your guitar perfectly with an interactive tuner

G-VOX Belt pack converts the sounds picked up by the G-VOX Pickup into a language your computer understands. That way, your computer can immediately process and display what you play on your guitar.



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Guitar 101

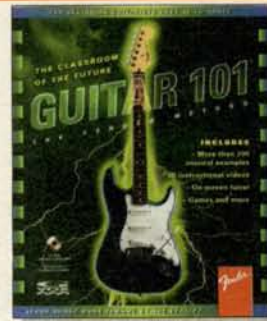
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Perspective: The digital generation

Growing Up Digital

By the year 2000 the Net-Generation will have reached 88 million people in the US and Canada alone. Don Tapscott, author of six books including *The Digital Economy* and *Paradigm Shift*, leads a research team that conducts online discussions with around 300 N-Geners over a one-year period.

The book is US-centric, with just a handful of youths participating from Europe and Asia-Pacific countries. Presumably this was not a deliberate bias by the author, but rather a reflection of the higher percentage of American N-Geners actively embracing the Internet. One of the fundamental observations Tapscott makes is that when it comes to using computers and the Internet, the knowledge hierarchy has been flipped on its head — many children are more literate than their parents and teachers.

The book suggests we've moved beyond the generation gap to a 'generation lap', where children are educating their elders on the use of technology. This leads to a discussion later in the book on the relationship between the old and new culture of work. If N-Geners grow up in an environment where anyone with the knowledge and skills can be a teacher or leader — regardless of age, status, wealth or creed — how will they view the old hierarchical model of the enterprise?

Tapscott's discussion of the N-Gen culture and the new enterprise is insightful, suggesting that theories on how to create innovative, high-performance corporations have been slow to take hold because they "were concepts in search of a generation whose culture suited them".

Tapscott presents an interesting perspective on the new generation of blocking programs which, rather than preventing access to adult sites, keep a detailed list of which sites the user has accessed and what has been downloaded. As Tapscott rightly argues, this introduces an Orwellian abuse of technology which is "no different to reading kids' mail or listening in on their phone calls".

While *Growing Up Digital* presents a fascinating profile of this generation — the way they think, learn, play and communicate — it becomes a little repetitive. Many of the same issues are addressed in multiple chapters. For example, distinctions between television and the Internet are littered throughout, reiterating the belief that children constantly analyse and evaluate everything they see, hear and read on the Internet, whereas most television is passive, "discouraging the development of imagination". Another point raised on several occasions is the fact that adults "accommodate" this new technology, whereas children and youth "assimilate" it.

Cathie Kennedy

■ **Author** Don Tapscott
 ■ **Publisher** McGraw-Hill
 ■ **Distributor** McGraw-Hill
 ■ **Phone** (02) 9415 9829
 ■ **Price** \$44.95
 ■ **ISBN** 0-07-063361-4
 ■ **Rating** ★★★★★

Wired Style: Principles of English Usage in the Digital Age

You're presenting at a workshop. You begin: "If you all click your m . . ." Wait, is it mouses or mice? What is the plural of that pointing device connected to a computer by its tail? Who IRL (in real life) knows how to pronounce URL, and why those funny looks when you said "electronic email" at last week's meeting? Why are emoney and cyberpunks joined while e-zine and cyber rights remain apart?

Wired Style: Principles of English Usage in the Digital Age has been written by the editors of *Wired Magazine* to answer questions like these and others that they confront daily. Without replacing traditional guides, *Wired Style* aims to help people share common meanings in the hope of "humanising writing about machines". Like *Time Magazine's* new vernacular in the late 1970s — back then you had to

read the magazine to learn the words people used at dinner parties — the authors have used their word-savvy *Wired Magazine* editors to compile a manual on language in the digital age, and to comment on its usage.

Fowler's English Usage has been used for decades, relying on formal, objective, English language rules to hand down established usage. The difference is that *Wired Style* elevates the colloquial, celebrates subjectivity, and relishes unruliness in pursuit of what its editors call voice: "writing that lets the reader know that a story is coming from someone who has been somewhere". Great tips for "jacking to the soul of a new society", or just getting people to read what you write in an information-satiated world. "Write the way people talk, don't insist on 'standard' English . . . don't sanitize and don't homogenize".

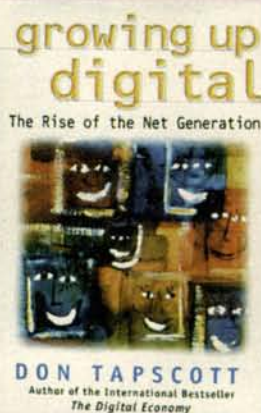
It's not written for techies, but for anyone who needs to know whether it's homepage or home page, or how to cite electronic publications, break a World Wide Web address at the end of a line, or decode and pronounce acronyms like OLE and OOP, without having those in the know lol (laugh out loud). This title will ensure you remain cool.

Each listing gives meaning and origin, as well as warnings on pronunciation, past tenses (loggoned or logged-on?), and avoiding redundancies like 'RAM memory'. It shows you how to avoid Internet usage that is ethnocentric, although this is perhaps an unmet challenge as quoting FCC to mean Federal Communications Commission, and tips on referring to the First Amendment still sounds US-centric to me!

This spiral-bound manual is printed in black on chartreuse-coloured pages, and it will grace your bookshelf inside its red video-cassette-like holder. It's well priced, so don't open your mouth at that meeting until you've bought, scanned and digested (grokked) it. By the way, according to *Wired Style*, it's mouses.

Wendy Bell

■ **Editor** Constance Hale
 ■ **Publisher** Hardwired
 ■ **Distributor** Woodslane
 ■ **Phone** (02) 9970 5111
 ■ **Price** \$32.95
 ■ **ISBN** 1-88869-01-1
 ■ **Rating** ★★★★★



*The federation of Australia —
how it all happened*
By Jeremy Torr

Step back in time

One Destiny — the Federation Story

As a comprehensive source of information on the times, the people, the places and the events surrounding the federation of Australia, One Destiny has no equal. For a touch under \$80, this CD is a beauty. The menu screen offers a superbly rendered image of the Federation Pavilion in Sydney's Centennial Park, which acts as the focus for all the information on the disc. It rotates to display various entry arches to People, Flag, Crown, First Day, Parliament, Debate, Voters and Colonists. Each of these are then split into further entries which give an exhaustive and highly detailed image and text picture of each entry.

All entries pop up a control bar along the top with a selection of newspaper, photo, speech, report and map sub-sections for each topic. Both images and text are very well presented, and have a spoken narrative where appropriate. Various links are highlighted, but they are fairly few and far between, often necessitating jumps back to the menu; luckily there is a Back key to make this quick and painless. Another quirk is that the windows are tiled, but not independent, so you have to close one to get to the one behind. But with a very decent search section, a good print facility and the capacity to bookmark any page, the advantages definitely outweigh the negatives.

The program also investigates a few of the less savoury aspects of federation, including White Australia, women's rights

and Aboriginal life, and includes a direct Web link so that updates on the current situation can be included. The included games — morse code and spot the character — are really rather basic and not that interesting. But apart from these, and the fact that you need a powerful machine to run it, there is almost nothing to criticise about this program.

■ Publisher	Global Vision
■ Distributor	Dataworks
■ Phone	(03) 9764 8344
■ Price	\$79.95
■ Requires	Pentium 90, Windows 95, 16M RAM, 4x CD-ROM drive, SVGA
■ Rating	★★★★★

Feng Shui

I'll bet you could do with a quick burst of good health, a revivification of your energy and enthusiasm and even a quick surge on the fertility meter, know what I mean, nudge, nudge, wink, wink? Well, blow me down if the perfect solution hasn't just plopped onto my unwittingly Chi-blasted desk. It's Feng Shui the CD-ROM, and it has my energy flows in a total spin.

The program takes the basic Wind and Water principle of Feng Shui and, just like *New Idea*, makes it understandable, accessible and exciting. All you have to do is click the mouse and you can instantly tell if you are in harmony with your surroundings or if you need a pot plant under the clock. OK, so that's a bit cruel, but the idea of a computerised program helping get intangibles like the spirits and energy flows lined up is a bit iffy in my book. And when the program failed to detect not only the poison-arrow-creating venetian blinds in my office, but also the presence of a sound-card in my computer, I started to get a bit worried about the program's Lou Pan (energy compass).

The program's design is very neat and coherent, and simple enough for a non-computer user to cope with (lots of big buttons with instructions written on them) and it has good-quality diagrams and images. The overall feel is of information



dissemination, and there are plenty of examples and tips for the home office and bedroom, and even an aside or two about shaky marriages and business operations. But there isn't a whole lot about the history, philosophy or deeper meaning of the practice.

If you are interested in the practical application of energy flows, this is worth a look. But Feng Shui for the seeker after truth and knowledge it definitely isn't. More like a furniture arrangement manual.

■ Publisher	CD-ROM Publishers
■ Distributor	Dataworks
■ Phone	(03) 9764 8344
■ Price	\$49.95
■ Requires	486, Windows, 8M RAM, 5M hard drive space, CD-ROM drive, VGA
■ Rating	★★

Blur Interactive

This CD-ROM contains crummy small-screen videos, some of the most pathetic games you have ever seen, and a menu designed for fumble-fingered giants — but it is still a winner. Not just because I love those sparky boys from Blur, but because of the sheer breadth of content on the three CDs. Obviously, you can listen to the cute Cockneys chanting all the favourites from their 'Parklife' album; watch the videos that go with the more popular songs; and even dig into the personal details of all the band members. But, there is much more than that.

The discs allow the would-be Blur acolyte to dissect the songs into sections, practise them along with pop-up words



Interactive News

● Having overcome the limitations that Intel forgot to mention when it designed the PCI bus, the first wave of PCI sound-cards has arrived. Creative and Diamond have both leapt into the fray with the Sound Blaster PCI64 and Monster Sound respectively. But initial reports indicate some problems with the new cards' compatibility with older, DOS-based games that used some tricks of the ISA bus to keep the sound flowing. On the bright side, the new cards will usher in an era of new digital sound capability with, at the very least, Dolby Pro Logic and, at best, Dolby AC-3 capability. Currently it looks as though the Microsoft Direct Sound 3D Audio standard is the one to go for, but future developments will definitely see the Dolby sales force muscling in to give us real home-theatre-style gaming. On the same front, Yamaha is pitching into the sound scene with a new range of speakers to complement its audio cards, based on the well-

established DSP chips used in commercial hi-fi systems.

● The other trend, card-wise, is the introduction by Matrox, ATI, VideoLogic, Diamond and others of multifunction cards. With the chip count on all add-in cards now falling dramatically in parallel with ever greater chip density, there is room to spare on a standard PCI card. Makers are taking advantage of this empty space and popping in extra chips that can now support 2D, 3D and sound — possibly even MPEG video decoding too — all in hardware on the one card. This obviously increases the price of the single card, but it does cut down on potential interrupt clashes and those configuration nightmares all multimedia users dread. The other issue that then arises is heat dissipation — add-in cards with heatsinks and their own fans are not too far away.

● Another audio-related gadget that has just seen the light of day is the Voice-It from Hot Products. This device records

audio and compresses it into its own hard RAM; nothing new there — mobile, solid-state dictaphones have doing this for ages. This latest version, the VR5000, solves the limited voice storage capacity of previous models by allowing the stored sound data to be downloaded into any PC and stored as WAV files. This means all those notes and musing can be kept and replayed at leisure from as big a hard drive as you can afford. It's a bit pricey at \$300-plus, but is a valid idea for those who don't want to tap away on pocket organisers.

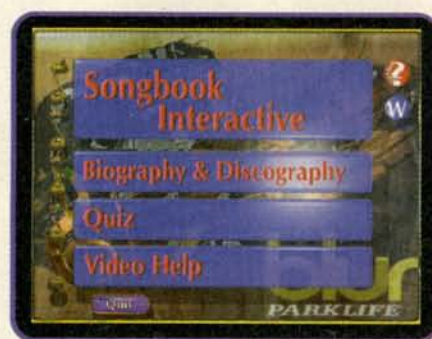
● Flat panel display is becoming a keenly contested area, this time at real-world prices. Fifteen-inch displays are now coming through from a host of makers including Sharp, Hitachi, NEC, Philips, Daewoo, Hyundai, LG and Samsung. Prices are currently slightly above the CRT opposition, but as sales numbers climb, expect marked drops in prices, as well as a huge expansion in available desk space.

onscreen, and chop them up, karaoke-style into vocals, keyboards, guitar and chorus sections. This means you can practise *ad infinitum* using the original lyrics and instrumentals, and really annoy the neighbours.

The guitar and keyboard sections also include some cute graphics (complete with bizarre coloured fingers) to show exactly how the music is made, with nary a chord or semiquaver in sight. Just follow the digital fingers and you will produce all the right notes. Each section allows the particular song aspect to be repeated or joined together so you can get both the pronunciation and speed just right before you venture on stage.

The package also allows direct connection to Blur sites on the Net, as long as you are signed up to an ISP, of

course. Some of the Blur knowledge quizzes are quite engaging, but there are some real dud sections such as the pointless spin/nudge trivia selector and the Chelsea videos, as well as the ridiculous Down the Dogs game. Overall, though, this is a real treat for Blur aficionados.



■ Publisher	Europress
■ Distributor	Europress Australia
■ Phone	(02) 9748 2555
■ Price	\$69.95
■ Requires	486/66, Windows 95, 8M to 16M RAM, 2x CD-ROM drive
■ Rating	★★★★

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Mystery, murder and mayhem. All part of this month's GameZone.

The dark side

Black Dahlia

In 1941, just as the US entered World War II, a vicious psychopath, dubbed the Torso Slayer by the media, committed several murders in Cleveland, Ohio. This real-life killer's haunts were the ghettos of that city and his *modus operandi* was to ritualistically dismember his victims.

Jim Pearson, an agent in the COI (Coordinator of the Office of Information) government agency, was already investigating a pro-German subversive group and unwittingly became involved in investigating the serial murders. As the hunt for America's first serial killer escalated, other investigators, including the 'Untouchable' Eliot Ness, were called in, but the killer was never found, despite nationwide and overseas



searches throughout the war. After war's end, a similar murder took place in Los Angeles, where aspiring Hollywood actress Elizabeth Short was brutally slain. She was dubbed the Black Dahlia by the local press, and the police believed Cleveland's Torso Slayer to be responsible, as there were many similarities to her case. A 1975 Hollywood movie called 'Who Is the Black Dahlia?' depicted these events.

This wonderfully extensive computer game includes all that is known about the case. The eight CDs have more than three hours of video and cinematic sequences, beautifully depicting more than 60 locations ranging from pre-war Cleveland to wartime Europe, and Los Angeles in the full swing of victory.

The quest is for the player (in the role of Jim Pearson) to catch the killer, who is hell-bent on completing some macabre

occult ritual. Over 60 puzzles are interwoven into this game's plot to stretch the player's abilities to the limit. It takes you across Europe and the US, where you investigate supposed links to Nazi Germany.

A unique and very clever interface allows you to get on with the game instead of learning how to get around; and the intuitive use of 'intelligent cursors' to depict the current status of Travel, Action, Compass and Direction also make navigation very simple.

Black Dahlia has a stunning level of realism and historically accurate settings, and is cinematic in its general presentation. Hollywood actors Dennis Hopper and Terri Garr head the cast of characters, which features over 50 speaking parts. As a gripping computer game this is second to none.

Eric Holroyd

■ Distributor	Directsoft
■ Phone	(02) 9482 3455
■ Online	http://www.bdahlia.com
■ Price	\$89.95
■ Requires	Pentium 120, 16M RAM, 4x CD-ROM drive, 1M video card
■ Classification	M 15+
■ Rating	★★★★

Die by the Sword

This Interplay blockbuster has so much going for it, it could even oust Tomb Raider from prime position. It's a graphic adventure of huge proportions in an underground setting where you, as Enric the adventurer, swipe and slash your blood-soaked way through a variety of enemies and situations in a quest to rescue your beloved Maya before she is given up as a ritual sacrifice.

The VSIM (Virtual Simulation) control system is the best I've yet seen in this type of game and is just terrific. Movement of the character's body, especially the arms, is very fluid and you have absolute control over every action — including the vital sword arm. It's a good idea to work through the move-



ment and fighting tutorial first. You'll then find the movements pretty easy to master after just a little practice. A cultured voice gives you instruction, and won't let you progress until you've mastered each segment.

Keyboard VSIM requires the left hand to be around the QWERT area and the right hand over the numeric keypad, but there's plenty of support for joysticks and gamepads too. A built-in Move Editor even lets you build your own moves if you fancy doing backflip attacks or spinning slashes.

There is an interesting Internet site at <http://www.dynip.com/dbts> where users worldwide are already swapping custom moves and setting up games in the Tournament mode.

The story covers seven great environments where your hero gets into some



awful scrapes. Battle scenes are frighteningly realistic and swinging your sword to lop off someone's head really makes the blood spurt. You can attack opponents from any angle — I even fought hanging

upside-down from a rope at one point, but you need all your skill as your enemies (Kobolds, Troggs, Ogres and such) are mostly intelligent and quite skilful. Losing a fight against an Ogre in the volcano labyrinth had Enric toppling backwards into the boiling Lava Pit.

Die by the Sword is a Windows 95



DirectX game for one to four players which also supports network Multiplay. It is quite bloodthirsty, but it's also very interesting and very good fun — which is what a good game should be. And this is certainly a good game.

Eric Holroyd

■ Distributor	Electronic Arts
■ Phone	(07) 5528 0500
■ Online	http://www.interplay.com
■ Price	\$89.95
■ Requires	Pentium 166, 32M RAM, 8x CD-ROM drive, 300M disk space
■ Classification	MA 15+
■ Rating	★★★★☆

The Journeyman Project 3 — Legacy of time

You are Gage Blackwood, Agent 5 for the Temporal Security Agency (TSA). For the past 11 years it has been your job to put a stop to any illegal use of time travel. Now time travel has been banned but there is one final job that you must undertake. That is to track down Agent 3 and recover the three pieces of an ancient artefact.

Travelling through the lost paradises of Atlantis, El Dorado and Shangri-la in your prototype Chameleon time-travel suit you will encounter many challenges. These challenges are woven into the story-line and start off fairly basic but progressively become more difficult. Your best tool for finding out information is your Chameleon suit. Normally a time-travel suit would look out of place in the ancient civilisations that you

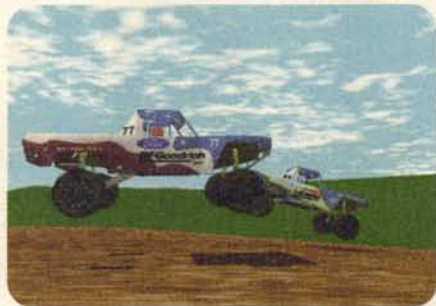
visit, but this one allows you to take the form of another person so you look like you belong.

The interface is easy to use and displays images of your inventory, your current costume, and a goofy-looking head representing Arthur, the AI being that talks to you throughout the game. A source of wisdom, wit, hints and sarcasm, Arthur often provides the advice that allows you to complete a particular challenge. For those who find Arthur's stale jokes and weak impressions of famous actors annoying, you can shut him up via the options menu.

The 360° interface allows great freedom to not only explore your surroundings but also take in the incredible scenery. Ancient cities, magnificent temples and ice-capped mountains are beautifully rendered. These picturesque landscapes, along with the well-chosen music, really immerse you in the game.

Movement in Journeyman 3 involves mouse-clicking, each click taking you a certain distance forward to the next 'node'. Luckily, you can 'stride' through a number of nodes and double your walking pace by enabling the Caps Lock key.

Though I'm not the greatest fan of the Myst or Riven types of adventure, I did find this game enjoyable. At times it can



be a little slow, but the feeling of satisfaction gained upon completion of the challenges makes up for that. Both Windows 95 and Mac versions are included.

Kieran McNamee

■ Distributor	Wolf Interactive
■ Phone	(02) 9417 9600
■ Online	http://www.legacyoftime.com
■ Price	\$89.95
■ Requires	Pentium 90, 16M RAM, 4x CD-ROM drive, 70M hard disk; PowerPC with System 7.5 or above, 16M RAM, 4x CD-ROM drive
■ Classification	G
■ Rating	★★★

SODA Off-Road Racing

Someone's bound to ask right away what SODA is. It stands for the Short-Course Off-Road Drivers Association, which has officially licensed Sierra's Windows 95 simulation of its favourite auto sport pursuit.

It's a good simulation too, and as it's from the producers of Nascar Racing 2, it has the same air of authenticity about it. There's an enormous range of setup and customise options on the various vehicles and courses, which will ensure lasting interest with plenty of variety. Vehicle control options include keyboard, joystick or steering wheel and the



program has its own calibration system to set these up properly. If you have the Microsoft Force Sidewinder there's support for that too, and for the uninitiated that means you can feel the steering wheel fighting back as you corner, and so forth.

As with many race games, you can choose Single races or Series, and of course there's a Multiplayer option via modem, LAN or direct serial connection. Whatever the option, the player (as the 'host') first creates a multiplayer session in which other players can then join. These sessions, which include Multiplay Chat, can be really exciting and competitive, and you need to be a good off-roader to get your name up on the World Rankings.

Four very demanding courses — Cliffs of Fear, Dragon's Claw, Figure of Eight, and Loop Jumpover — are available, and vehicles react very realistically to the different surfaces during a particular race. Driving on red shale and negotiating tortuous bends suddenly became a whole new ball game when the 'road' turned to sloppy mud! It became truly 'off road' for me then, as I skidded off the track and flipped right over.

When you've mastered those courses there's an excellent Track Designer to

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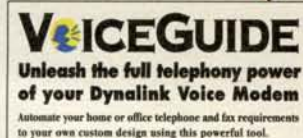
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build your own. Its easy interface lets you place heaps of obstacles on whatever shape of track your evil mind can dream up. Then the program 'learns' your track so that computer opponents can give you a hard time on it. In the Vehicle option I chose the 800 HP 4 x 4 monster (to bully my way through), but later found the much lighter and more manoeuvrable 150 HP buggy more to my liking, although much more driving skill was required. The other choice is a high 2 x 4 truck. All the vehicles are hard to master if you want to be top driver — but then, you should strive to be the best.

Eric Holroyd

■ Distributor	Wolf Interactive
■ Phone	(02) 9417 9600
■ Online	http://www.sierrasports.com
■ Price	\$89.95
■ Requires	Pentium 133, 2x CD-ROM drive, 16M RAM
■ Classification	G 8+
■ Rating	★★★★

Ultimate Race Pro

True motor sport enthusiasts don't seem to use the word 'fast' when talking about their machines, preferring to say their car is 'quick'. And that's certainly what Ultimate Race Pro is, quick — with a capital Q.

Racing around the twisted and devious City, Country and Desert tracks is so realistic that after one especially long and trying session I actually felt a little carsick. A 3D accelerator card adds to the realism.

The four standard tracks range from moderately easy to very difficult, and the huge variety of user-configurable options allows you to make them even harder. Simply holding a race at night instead of during the day makes it pretty tricky, but when you add bad weather and heavy rain it can become a nightmare. Running a race in heavy rain means a slippery road surface with hair-raising bends. Strong winds also buffet the car around, so you do plenty of skidding. The top difficulty level is Ultim@te, and here you do all of the above with the added inconvenience of fog. If ever you feel that you've mastered those conditions, you can start all over again by simply mirroring the track so that you now corner to the right where it was previously a left turn.

Your computer opponents in these races are mostly barbaric and uncouth hoons who'll try to better you with whatever race tactics they can come up with.

Luckily you have a great choice of souped-up street cars in which to race, with great names like Harbinger, Loco Lobo Mk II, Team Wildfire, and so on, and you can set various options on them in a neat little menu. Here, power bars show maximum speed, acceleration, grip and other controls, although there's a trade-off, as



increasing one characteristic automatically reduces another.

Graphically, Ultimate Race Pro is great, and the many graphic options include fine details such as smoke, sparks and skid marks.

It takes a little while to load from the CD, but the iconised main menu is worth waiting for. After you've selected and tuned your car and chosen the track, you just click the chequered flag to be off and racing — quick smart!

Eric Holroyd

■ Distributor	Microprose
■ Phone	(02) 9953 8788
■ Online	http://www.ultimaterace.com
■ Price	\$79.95
■ Requires	Pentium 166, 32M RAM, 4x CD-ROM drive, (optional: 3D GFX card, steering wheel or joystick)
■ Classification	G
■ Rating	★★★★☆

Lords of Magic

From the producer of Lords of the Realm I and II comes an excellent blend of combat, strategy and fantasy role-play, in a turn-based game setting.

And it's a huge game. Lords of Magic has more gnomes, elves, gargoyles and dragons than you can shake a broadsword or magic artefact at. The story-line has a somewhat familiar ring to it. The peaceful land of Urak has had

the forces of darkness unleashed upon it by Balkoth, the evil sorcerer. The inhabitants have long prayed for a leader, and now that you've shown up, it looks like you're it. So, you must get together your chosen band of sturdy adventurers and do your best for them. Fail, and their future is very bleak.

It's not all fighting and battle, though — you need to develop skills in bartering and resource management too. This part is very interesting, and a clever screen layout lets you set the tone for deals you propose. Setting it as a Trade, Request, Gift, Plea or Threat puts it in context for



the other party, so you need to do some fancy political footwork, checking the other side's Hatred, Distrust, Fear and Empathy levels and so on before putting your deal on the table. I hadn't previously seen this aspect in a game and found it most intriguing.

Lords of Magic is a complex game and you'll find more and more information swirling around your head the more you get into it. To help identify everything, Sierra has included a wall poster depicting all the characters; the manual also has six handy pages where all Spells and Artefacts are itemised. Graphically splendid, and with sound effects and eerie music to match, Lords of Magic is a quest of devious wizardry where fiery dragons, barbarians and vampires abound.

Eric Holroyd

■ Distributor	Wolf Interactive
■ Phone	(02) 9417 9600
■ Online	http://www.sierra.com
■ Price	\$89.95
■ Requirements	Pentium 133, 32M RAM, 12x CD-ROM drive, SVGA, 135M hard disk space
■ Classification	G 8+
■ Rating	★★★★☆

The Web as a medium for spreading ideas, beliefs and information.

Cultural exchange

Detritus.net

Detritus is simply decomposed matter. The sludge at the bottom of your garbage bin is detritus, and it works its way back up the food chain to eventually reappear on our supermarket shelves. Detritus.net, however, is not about old fruit and vegetables. It is about the recycling of culture (digital art and digital music in particular), free from the constraints of copyright and censorship.

The Internet is often viewed as a vehicle for transferring underground information and Detritus.net takes advantage of the fact. It encourages "appropriation, plagiarism, piracy, copyright infringement, even stealing". It argues that every new product or concept is just a rehash of something created before.

"Everyone does it, from Picasso to Portishead, Shakespeare to Chumbawamba... Nothing is new, everything is permitted, ideas are free. That's what this site is about." Every page concludes with the tagline "N© Detritus.net. Sharerights extended to all."

The site has some interesting ideas, but it's nothing special in terms of graphics. Bright green text on a black background predominates. On the front page there is an interesting black-and-white collage by the German Dada artist John Heartfield depicting him cutting off the head of a Nazi politician with a very large pair of scissors.

The Detrivore pages provide server space for artists who plagiarise, or 'recycle culture'. The site's designer and administrator Steev Hise has a page which just serves as a host to links for his other home pages, although you can watch part of a digital video he made. Bob Ostertag's is the most detailed page, but it still doesn't contain very much information. Ostertag is apparently well known for his unorthodox work in digital sampling and recording.

The main problem with the site is that for those who have never heard of digital recycling, the site has very little background material. It promotes works that violate copyright law, including Illegal Art's controversial 'Deconstructing Beck', for just \$US8. The CD contains electronically manipulated, unauthorised samples of the work of alternative icon Beck Hansen. The site has notes on the tracks, RealAudio clips and email addresses for the composers.

Streaming MPEG-1 Layer 3 audio is available in the archive, including John Oswald's entire Plunderphonic CD, Negativland's U2, and the rare 1987 KLF album that was suppressed for copyright violation.

It's not only Danish pop group Aqua that has raised the ire of Mattel. The best



part of Detritus.net is actually a mirror site of the Distorted Barbie site on which Mattel clamped down for trademark infringements. Digitally morphed images of the famous doll, including Bjork Barbie and X-Files Barbie, can now only be seen on the mirror site. Detritus.net is encouraging others to put up mirror sites of the Distorted Barbie and offers it as a tarfile for you to download.

There is a text index for those who have text-only browsers or slow connections. It also helps you find a particular page quickly, although navigation is already straightforward. The information available is limited, but the ideas are honestly presented.

Claire Waddell

■ Online <http://www.detritus.net>

■ Rating ★★☆☆

DisInformation

Anyone who thinks what's shown on the evening news is the whole story probably still believes in the Easter Bunny. Those who realise there are many sides to every story will get a lot out of DisInformation, an independent news search engine and site.

Reviewing a site called DisInformation seems a big ask, given that the nature of disinformation, as the opposite of information, is to be misleading, biased or uninformative. Is it possible to disinform

badly? But the name is a misnomer, as the purpose of DisInformation is to arm the reader for the "total information war that is being waged right now," according to creative director Richard Metzger.

DisInformation was funded by cable giant TCI Interactive before being dumped, and is now run by Metzger from his Manhattan apartment. It aims to fill the gap left by the long-since-impartial 'fourth estate' and to "provide the context that intelligent people desperately need in order to form responsible opinions". The so-called "subculture search engine" is designed for people looking for information on current affairs, politics, science and, best of all, the 'hidden information' not reported by the world's 20-odd corporate media conglomerates.

The Internet is the right medium for such a service with its history of counter-culture, independent thought and providing a way for individuals to bypass the control of media conglomerates to broadcast their views. In addition, the Internet allows DisInformation to house a vast array of information and give users a means of accessing relevant information extremely quickly.

DisInformation's search engine certainly does bring up the dirt. The first 10 listings in a search on 'Clinton' returns ParaScope's Clinton Scandal Archive; the book *Clinton Scandals, Inc.*; and The Bill Clinton Body-Count. Although it may sound like a haven for conspiracy theorists' newsletters, DisInformation's database takes articles primarily from mainstream US news sources such as HotWired and CNN, a few more alternative news sources such as *The Nation*, and *Atlantic Monthly* and alternative sites like Feminist Majority News and Mojo Wire. These sources are indexed



fairly frequently, but it's not quite up with yesterday's news.

DisInformation also contains several sections of recommended sites in a format similar to Yahoo or Excite. The Revolutionaries section, for example, has short bios and recommended links for Timothy Leary, William S Burroughs, Noam Chomsky, Philip K Dick and more.

DisInformation also provides what it calls a 'metazine', where different DisInformation departments feature 'dossiers' of selected sites covering different sides of a given issue, such as Roswell, Prozac and TWA Flight 800.

The design of the site, by the much-lauded Razorfish, is a good example of how to be economic with graphics while creating a really good-looking site. If I did have to criticise DisInformation, it would be according to the same criteria it uses to criticise other news services. The choice of media providers it indexes is fairly mainstream, US-centric and English-language-only, and it doesn't give bylines for opinion pieces and reviews. But as the Internet becomes more mainstream, I'm glad there's some good-quality disinformation out there.

Dominique Jackson

■ Online <http://www.disinformation.com>
 ■ Rating ★★★★★

Hyperreal.org

For some people, nightclubs and dancing represent more than the occasional night out, they're a way of life. Hyperreal is a collaborative Web site that was born out of a San Francisco rave mailing list and covers the whole gamut of rave culture.

As someone who doesn't know a lot about rave culture, much of this site went completely over my head. Nevertheless, it wins points for its depth. The site would be a good starting point for anyone interested in the rave scene. Part of the site, GRID, contains a database listing the locations of raves. We searched for Australian raves but to no avail, so Australian ravers may like to get onto the site and provide some details.

Ultimately, a site like this is only going to be as good as the information its contributors provide, and this one appears to be very thorough, although, as with any site, the accuracy will have to be decided by the user.

There are chat rooms, information on DJs, clubs and groups, mailing lists and FAQs aplenty, which should satisfy both newbies and hard-core ravers. Entering a new scene is daunting at best, so the Rave FAQ is particularly useful and you should be able to use it

Surfbaud: Shopping mall

If you loathe queues or plodding through aisle after aisle and beating off another shopper for that last tub of 99-cent margarine, grab your virtual trolley and hop online — there's shopping aplenty, and not another person to be seen.

For a start, you can grab yourself one of Yahoo's very cool, metallic Visa cards (<http://www.yahoo.com/promotions/yahoovisa>) and head on down to the Same Old Grind (<http://www.fbsolutions.com/cjw3/ccard.htm>), a specialty tea and coffee shop offering paranoid surfers an easy-to-follow guide to online transactions and credit card privacy.

But, just because you are paranoid doesn't mean that someone isn't looking over your shoulder, so the truly mistrustful can drop by Telstra's SureLink service (<http://yellowpages.com.au/yp/sguide>), a collection of local and international online merchants offering verified secure shopping.

Next, you need some muzak to shop by. CDnow (<http://www.cdnw.com>) is an online jukebox of rock, pop, electric, folk and country music. It even offers New Age titles for those of you who like to surf to the mesmerising melodies of gently spilling water over moss-covered rocks and other harmonic sounds of nature.

Ever fantasised about going shopping in your underwear? Umm, not that I have, but you could if you wanted to at any one of hundreds of huge and completely empty virtual shopping centres such as <http://www.aaaaustralia.com.au> or <http://www.exton.com>, where you will find a plethora of useless trinkets to part

you and your money. No snooty shop assistants and no screaming kids!

However, if it's clothes you're after, you can either visit regular shops (<http://www.wal-mart.com>), or buy the same clothes for triple the price at brand-name stores in the very swish New York Fashion Mall (<http://www.fashionmall.com>). Oh, and if you do happen to need some new underwear, visit Lenny at Loose Jocks (<http://www.loosejocks.com>) for some advice on the joys of baggy undies.

All this surfing and shopping is bound to make you hungry, and what better way to sate a groaning tummy than with chocolate? Gourmet Chocolate (<http://www.gourmetchocolate.com>) is a feast of the world's finest white, milk and dark chocolates. For your token 'healthy' purchase, try <http://greengrocer.com.au>, a high-tech Sydney greengrocery which will deliver just about any manner of fruit, vegetable or herb to your door.

Are you the kind of person who always gives gift vouchers because you are clueless when it comes to shopping (or couldn't be bothered to turn the telly off and drive up the road to find a gift)? If you'd like to appear as if you've gone to enormous trouble to find the perfect pressie, you can't go wrong with an Aussie hamper from <http://www.hamper.com>. But if you are going for that 'sentimental-friend' feeling, why not adopt a whale, manatee or dolphin (<http://www.whaleclub.com/store/store.html>) in your friend's name?

Samantha Amjadali



handle the whole spiky issue quite well. The general stance is that drugs are illegal and dangerous, so if you are going to do them, you should at least know what you are getting yourself into. Yes, this site does contain drug recipes, but it takes a bit of work to find them. Further, having perused the recipe for PCP, I have to say I still have no idea what half the ingredients are, let alone where to get them and how to make it.

The site recently changed its domain name from .com to .org to reflect its non-profit status and it's obvious that the site is created with a love of the topic. You can't really ask for more than that from a Web site.

Kerrie Murphy

■ Online <http://www.hyperreal.org>
 ■ Rating ★★★

to identify the different types of rave and techno music after reading this, from Trance to Ambient to Tribal to Progressive.

Of course, there's one aspect of rave culture that can't be ignored and that's the big 'd' word — Drugs. This site manages to



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Chip Chat hasn't even thought about this year's tax return yet. But then, being a sarcastic columnist with no expense account means never having to say you're liable.

Chip Chat

It's not a vegetable

From the minute we heard that Intel's low-end processor had been dubbed the Celeron, we've been trying to work out what the word really means. The most popular suggestions around the office have included a vegetable, a diuretic, a brand of breakfast cereal and a dodgy imported car.

However, official Intel documentation reveals a different side to the story: "The Celeron name has no meaning in the English language," trumpets the company's allegedly serious document on the subject. The document also

reveals that the name has resonances beyond the merely celery-like. "The sound symbolically conveys the high-tech nature . . . The four consonants create a smooth flowing sound, giving it a pleasant poetic quality."

With the take-up rate on the Celeron not exactly earth-shattering, we're glad they can still laugh about it.

Barely had the ink dried, however, when Intel revealed that it has further plans for a high-end processor to go by the name of Xeon. Any relationship to a certain well-known warrior princess is, we are assured, entirely coincidental.

Bill Gates: Spot the bookmarks

A small number of our readers expressed concern after April's Chip Chat 'PieGate' extravaganza that we were being a tad unfair to Bill Gates III. While the large number of entries received in our PieGate contest suggests such views were in the minority, we would like to point out that we're not alone.

When a demonstration of Windows 98 by the Microsoft scion crashed in mid-April, the world press went insane (as is its wont). "The world's richest man was left red-faced and shaking his head, when the new, fast, easy-to-operate and reliable system fell in a heap in front of an attentive audience," gloated one wire service. And why not, we say?

And he sings, too!

Is Communications Minister Senator Richard Alston the new Kerri-Anne? At April's 'Enabling Australia' conference in Canberra, when delegates expected to see a cross to Cisco CEO John Chambers speaking about electronic commerce, they instead saw a comfortable, well-buffed and combed Alston sitting in the interviewer's chair, setting the scene and asking Chambers the questions.

It was no sparing match. Alston took on a 'Midday Show'-style, chatty role. The next half-hour was a strange concoction of persuasion, notes of what was happening in Australia, prodding on Cisco activities and the occasional 'noddy'. "Generally there is a skills shortage, isn't there . . . And how are we placed . . . And tell us about . . ." said Alston.

And what was the response of journalist and conference chairperson George Negus? Don't give up your day job.

Search engines: Oh yeah!

This month's insane search engine statistic relates, as usual, to absolutely nothing. For reasons that still elude our comprehension, searching on the words 'Windows', 'mushroom' and 'jack russell terrier' reveals no documents, but searching on the words 'Windows', 'mushroom' and 'wolfhound' reveals at least 14. ■

Contest: A load of hot air

Many of the documents which pass across Chip Chat's desk are sitting on the far side of stupid. But we were particularly taken recently by a press release headed 'Motorola Launches a Huge Hot Air Balloon'. In a move unlikely to shock anybody, this detailed how Motorola had launched a huge hot air balloon. Not exactly a world first, you'd have to admit.

The balloon in question has a giant Motorola logo on the side, which seems a bit of a waste when you think about it. After all, there are so many other messages which could be presented through this medium. What about a Microsoft balloon with the

message 'Bill's watching you'. Or even just 'Banyan: We're still here'?

As you can probably sense, there's a competition coming on here. We want your suggestions for the IT-related message you'd like to see on the side of a balloon.

The author of the most amusing submission will win a year's subscription to APC. Enter by sending email to mybeautifulballoon@acp.com.au, or write to My Beautiful Balloon, APC, Level 8, 54 Park Street, Sydney NSW 1028. Entries close June 19, 1998; the winner's name will be published on our Web site. For full terms and conditions, see page 209.



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Value

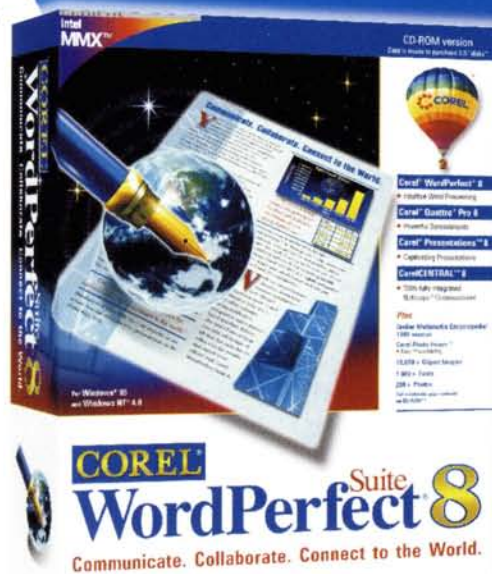
With four complete applications, supporting tools and features that enhance productivity and great value-added extras, Corel WordPerfect Suite 8 helps you meet all your business needs and lower your total cost of ownership.

Innovation

By combining world-class applications, phenomenal speed, exceptional cross-application integration and outstanding Internet tools, Corel WordPerfect Suite 8 offers advanced software to get the job done.

Compatibility

Corel's commitment to compatibility makes it easy for you to share information across programs, platforms and even between different products. Seamlessly open files created in previous versions of Corel business software. Transfer information between applications and collaborate across platforms with ease. Plus, new conversion filters let you effortlessly share files between Corel WordPerfect Suite 8 and many other office suites.



KUR-0556-UK

This advertisement was designed and created using award-winning Corel graphics software.

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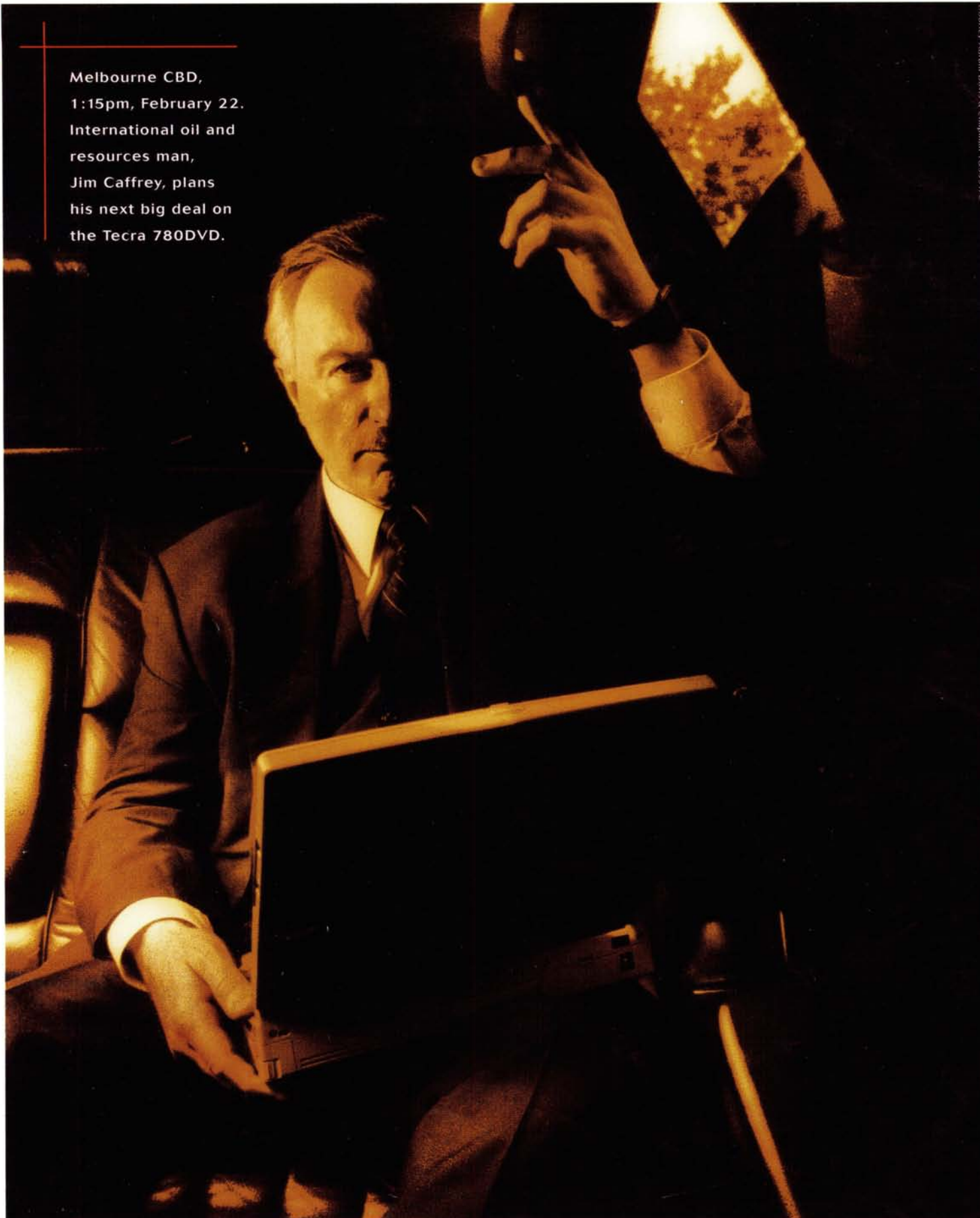
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